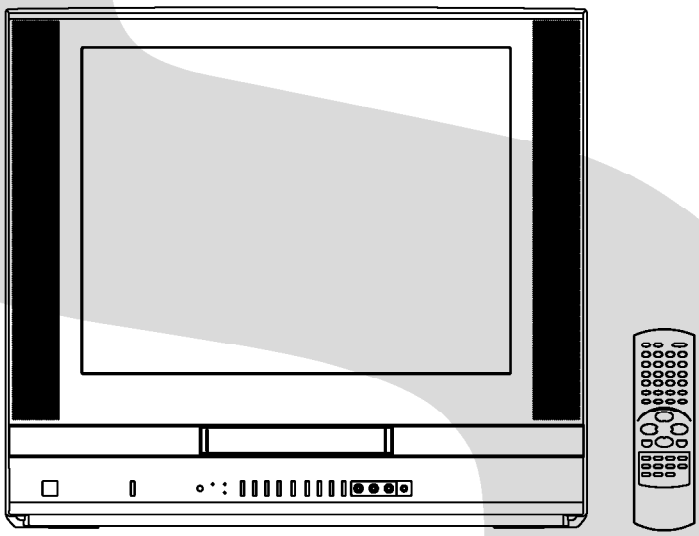
TOSHIBA

FILE NO. 140-200117

SERVICE MANUAL

COLOR TELEVISION/ VIDEO CASSETTE RECORDER

MV20FL3



SERVICING NOTICES ON CHECKING

1. KEEP THE NOTICES

As for the places which need special attentions, they are indicated with the labels or seals on the cabinet, chassis and parts. Make sure to keep the indications and notices in the operation manual.

2. AVOID AN ELECTRIC SHOCK

There is a high voltage part inside. Avoid an electric shock while the electric current is flowing.

3. USE THE DESIGNATED PARTS

The parts in this equipment have the specific characters of incombustibility and withstand voltage for safety. Therefore, the part which is replaced should be used the part which has the same character.
Especially as to the important parts for safety which is indicated in the circuit diagram or the table of parts as a ⚠ mark, the designated parts must be used.

4. PUT PARTS AND WIRES IN THE ORIGINAL POSITION AFTER ASSEMBLING OR WIRING

There are parts which use the insulation material such as a tube or tape for safety, or which are assembled in the condition that these do not contact with the printed board. The inside wiring is designed not to get closer to the pyrogenic parts and high voltage parts. Therefore, put these parts in the original positions.

5. TAKE CARE TO DEAL WITH THE CATHODE-RAY TUBE

In the condition that an explosion-proof cathode-ray tube is set in this equipment, safety is secured against implosion. However, when removing it or serving from backward, it is dangerous to give a shock. Take enough care to deal with it.

6. AVOID AN X-RAY

Safety is secured against an X-ray by considering about the cathode-ray tube and the high voltage peripheral circuit, etc.
Therefore, when repairing the high voltage peripheral circuit, use the designated parts and make sure not modify the circuit.
Repairing except indicates causes rising of high voltage, and it emits an X-ray from the cathode-ray tube.

7. PERFORM A SAFETY CHECK AFTER SERVICING

Confirm that the screws, parts and wiring which were removed in order to service are put in the original positions, or whether there are the portions which are deteriorated around the serviced places serviced or not. Check the insulation between the antenna terminal or external metal and the AC cord plug blades. And be sure the safety of that.

(INSULATION CHECK PROCEDURE)

1. Unplug the plug from the AC outlet.
2. Remove the antenna terminal on TV and turn on the TV.
3. Insulation resistance between the cord plug terminals and the eternal exposure metal **[Note 2]** should be more than 1M ohm by using the 500V insulation resistance meter **[Note 1]**.
4. If the insulation resistance is less than 1M ohm, the inspection repair should be required.

[Note 1]

If you have not the 500V insulation resistance meter, use a Tester.

[Note 2]

External exposure metal: Antenna terminal
Earphone jack

HOW TO ORDER PARTS

Please include the following informations when you order parts. (Particularly the VERSION LETTER.)

1. MODEL NUMBER and VERSION LETTER
   The MODEL NUMBER can be found on the back of each product and the VERSION LETTER can be found at the end of the SERIAL NUMBER.
2. PART NO. and DESCRIPTION
   You can find it in your SERVICE MANUAL.

GENERAL SPECIFICATIONS

G-1	TV System	CRT	CRT Size / Visual Size	20 inch	/ 508.0 mmV
			CRT Type	Flat	
			Deflection	90	degree
			Magnetic Field BV/BH	+ 0.45 G	/ 0.18 G
		Color System		NTSC	
		Speaker		2 Speaker	
			Position	Front	
			Size	3 Inch	
			Impedance	8	ohm
		Sound Output	MAX	1.5W + 1.5W	
			10%(Typical)	1.5W + 1.5W	
G-2	VCR System	System		VHS Player / Recorder	
		Video System		NTSC	
		Hi-Fi STEREO		Yes	
		NTSC PB		No	
		Deck	DECK	OVD-6S	
			Loading System	Front	
			Motor	3	
		Heads	Video Head	4 Head	
			FM Audio Head	2 Head	
			Audio /Control	Mono	/Yes
			Erase(Full Track Erase)	Yes	
		Tape Speed	Rec PAL	-	
			Rec NTSC	SP/SLP(EP)	
			Play PAL	-	
			Play NTSC	SP/SLP(EP)	
		Fast Forward / Rewind Time (Approx.)		FF:4'50"/REW:2'30"	
			with Cassette	T-120	
		Forward/Reverse Picture Search	NTSC or PAL-M	SP/SLP(EP) = 3x,5x / 9x,15x	
		Frame Advance		1/10	
		Slow Speed		1/10	
G-3	Tuning System	Broadcasting System		US System M	
		Tuner and Receive CH	System	1 Tuner	
			Destination	US(w/CATV)	
			Tuning System	F-Synth	
			Input Impedance	VHF/UHF 75 ohm	
			CH Coverage	2~69, 4A,A-5~A-1, A~I, J~W,W+1~W+84	
		Intermediate Frequency	Picture(FP)	45.75MHz	
			Sound(FS)	41.25MHz	
			FP-FS	4.5MHz	
		Preset CH		No	
		Stereo/Dual TV Sound		US-ST	
		Tuner Sound Muting		Yes	
G-4	Signal	Video Signal	Input Level	1 V p-p/75 ohm	
			Output Level	1 V p-p/75 ohm	
			S/N Ratio (Weighted)	50	
			Horizontal Resolution at SP Mode	220Line	
		Audio Signal (0dB=0.775Vrms)	Input Level	-8dB/50Kohm	
			Output Level	-8dB/1Kohm	
			S/N Ratio at SP (Weighted)	38	
			Harmonic Distortion (1KHz)	1.5	%
			Frequency Response at SP	100Hz - 10kHz	
			at LP	-	
			at SLP	100Hz - 4kHz	
		Hi-Fi Audio Signal	Dynamic Range : More than	90	dB
			Wow And Flutter : Less than	0.01	%Wrms
			Channel Separation : More than	60	dB
			Harmonic Distortion : Less than	1.0	%
G-5	Power	Power Source	AC	120V,60Hz	
			DC	-	
		Power Consumption	at AC	115 W at 120 V 60 Hz	
			at DC	-	
			Stand by (at AC)	5 W at 120 V 60 Hz	
			Per Year	-	
		Protector	Power Fuse	Yes	
			Dew Sensor	No	
G-6	Regulation		Safety	UL	
			Radiation	FCC	
			X-Radiation	DHHS	
G-7	Temperature		Operation	+5oC ~ +40oC	
			Storage	-20oC ~ +60oC	
G-8	Operating Humidity			Less then 80% RH	

GENERAL SPECIFICATIONS

G-9	**On Screen Display**	Menu			Yes
			Menu	Type	Character
			Timer Rec Set		Yes
			Channel Setup		Yes
				TV/CATV	Yes
				Auto CH Memory	Yes
				Add/ Delete	Yes
				Guide CH Set	No
			TV Setup		Yes
				V-chip Set	Yes
				On/Off Timer Set	Yes
				Picture	Yes
				Audio	Yes
				Sap On/Off	Yes
			Auto Repeat On/Off		Yes
			System Setup		Yes
				Clock Set	Yes (Calendar 12h)
				Language	Yes
				Auto Clock On/Off	Yes
				Standard Time	Yes
				Daylight Saving Time	Yes
			Commercial Advance		No
				Marking On/Off	No
				Blueback On/Off	No
				Playback Auto/Manual	No
				Unmarked Tape	No
			Movie Advance		No
				Go To Movie	No
				Go To Preview	No
		G-CODE(or SHOWVIEW or PLUSCODE)No. Entry			No
		Clock / Date			Yes
		CH/AV			Yes
		Tape Counter(Linear Counter)			Yes
		Tape Speed			Yes
		Sleep Time			Yes
		Stereo/Audio Output			Yes
				Bilingal	No
				SAP	Yes
		Control Level	Volume		Yes
			Bright / Contrast / Sharpness / Color		Yes
			Tint		Yes
			Base/Treble/Balance		Yes
			Manual Tracking		Yes
		Play/Stop/FF/Rew/Rec/OTR/T-Rec/Pause/Eject/Tape In (Symbol Mark)			Yes
		Auto Tracking/Manual Tracking			Yes
		Caption / Text			Yes
		Index			No
		Muting			Yes
		Hi-Fi			Yes
		Repeat			Yes
		Zero Return			No
		DEW			No
G-10	**OSD Language**				English French Spanish
			OSD Language Setting		English
G-11	**Clock,Timer and Timer Back-up**	Calendar			1990/1/1 ~ 2081/12/31
		Timer Events			8 Program/ 1 Month
		One Touch Recording Max Time			5 Hours
		OTPB Valid Time			No
		Sleep Timer		Max Time	120 Min
				Step	10 Min
		On/Off Timer		Program(On Timer / Off Timer)	1 Program
		Auto Shut Off		No Signal	15 Min
				No Operation	No
		Timer Back-up (at Power Off Mode)			5 Sec

GENERAL SPECIFICATIONS

G-12	Remote Control	Unit		RC-DQ
		Glow in Dark Remocon		Yes
		Format		NEC
		Custom Code		40-BFh,44-BBh
		Power Source	Voltage(D.C)	3V
			UM size x pcs	UM-4 x 2 pcs
		Total Keys		44 Keys
		Keys	Power	Yes
			1	Yes
			2	Yes
			3	Yes
			4	Yes
			5	Yes
			6	Yes
			7	Yes
			8	Yes
			9	Yes
			0	Yes
			CH Up	Yes
			CH Down	Yes
			Volume Up	Yes
			Volume Down	Yes
			Input Select	Yes
			Play	Yes
			F.Fwd	Yes
			Rew	Yes
			Pause/Still	Yes
			Stop	Yes
			Rec/OTR	Yes(2Keys)
			Eject	Yes
			Counter Reset	Yes
			Speed	Yes
			Timer Rec	Yes(2Keys)
			TV Monitor	No
			Quick View	Yes
			Program	Yes
			Slow	Yes
			Auto Tracking	Yes
			Set/Tracking+	Yes
			Set/ Tracking -	Yes
			Menu	Yes
			Enter	Yes
			Cancel	Yes
			Call	Yes
			TV/Caption/Text	Yes
			Sleep Timer	Yes
			Muting	Yes
			Zero Return	Yes
			CM Skip	Yes
			Audio Select	Yes
G-13	Features	Auto Head Cleaning		Yes
		Auto Tracking		Yes
		HQ (VHS Standard High Quality)		Yes
		Auto Power On, Auto Play, Auto Rewind, Auto Eject		Yes
		VIDEO PLUS+(SHOWVIEW,G-CODE)		No
		Auto Clock		Yes
		Forward / Reverse Picture Search		Yes
		Reverse Slow		No
		One Touch Playback		No
		Auto CH Memory		Yes
		Closed Caption		Yes
		TV Auto Shut off Function		Yes
		End Call		No
		Index Search		No
		SQPB		No
		CATV		Yes
		CM Skip(30sec x 6 Times)		Yes
		Comb Filter		Yes
		TV Monitor		No
		Program Extend		No
		Choke Coil		No
		Energy Star		Yes
		Protect of FBT Leak Curcuit		Yes
		Dirty Head		No
		V-chip	USA V-chip	Yes
			CANADA V-chip	No
		CM Advance		No
		Movie Advance		No

GENERAL SPECIFICATIONS

G-14	**Accessories**	Owner's Manual		Language	English
				w/Guarantee Card	Yes
		Remote Control Unit			Yes
		Battery			Yes
				UM size x pcs	UM-4 x 2 pcs
					No
		Rod Antenna			No
				Poles	-
				Terminal	-
		Loop Antenna			No
				Terminal	-
		U/V Mixer			No
		300 ohm to 75 ohm Antenna Adapter			Yes
		Antenna Change Plug			No
		DC Car Cord (Center+)			No
		AC Plug Adaptor			No
		AC Cord			No
		AV Cord (2Pin-1Pin)			No
		Guarantee Card			No
		Registration Card			Yes
		ESP Card			Yes
		Warning Sheet			No
		Dew/AHC Caution Sheet			No
		Quick Set-up Sheet			No
		Circuit Diagram			No
		Service Facility List			No
		Important Safeguard			No
G-15	**Interface**	Switch		Power	Yes
				Play	Yes
				Pause/Still	No
				System Select	No
				One Touch Playback	No
				Channel Up	Yes
				Channel Down	Yes
				F.FWD/Cue	Yes
				Eject/Stop	Yes
				Main Power SW	No
				Volume Up	Yes
				Volume Down	Yes
				Rew/Rev	Yes
				Rec/OTR	Yes
				Input Select	No
		Indicator		Power	Red
				Rec/OTR	Red
				T-Rec	Red
				On Timer	No
				CS	No
		Key Light up		Rec/OTR	No
				One Touch Playback	No
				Play	No
		Terminals	Front	Video Input	RCAx1
				Audio Input	RCA x 2(Stereo)
				Other Terminal	Head Phone(Stereo & Mono, 3.5mm)
			Rear	Video Input	RCAx1
				Audio Input	RCA x 2(Stereo)
				Video Output	RCAx1
				Audio Output	RCA x 2(Stereo)
				Euro Scart	No
				Diversity	No
				Ext Speaker	No
				DC Jack 12V(Center +)	No
				VHF/UHF Antenna Input	F Type
				AC Inlet	No
G-16	**Set Size**			Approx. W x D x H (mm)	574 x 483 x 514.5
G-17	**Weight**			Net (Approx.)	26.5 kg(58.5 lbs)
				Gross (Approx.)	28.5 kg(62.9 lbs)

GENERAL SPECIFICATIONS

G-18	**Carton**	Master Carton		No
			Content	-
			Material	-
			Dimensions W x D x H(mm)	-
			Description of Origin	-
		Gift Box		Yes
			Material	DOUBLE/WHITE
			Dimensions W x D x H(mm)	647 x 627 x 625
			Design	As per Buyer's
			Description of Origin	Yes
		Drop Test	Natural Dropping At	1 Corner / 3 Edges / 6 Surfaces
			Height (cm)	31
		Container Stuffing	(40' container)	171 Sets
G-19	**Cabinet Material**		Cabinet Front	PS 94V0 DECABROM
			Cabinet Rear	PS 94V0 DECABROM
			Jack Panel	PS 94V0 DECABROM

DISASSEMBLY INSTRUCTIONS

1. REMOVAL OF MECHANICAL PARTS AND P.C. BOARDS

1-1: BACK CABINET (Refer to Fig. 1-1)

1. Remove the 6 screws ①.
2. Remove the 2 screws ② which are used for holding the Back Cabinet.
3. Remove the AC cord from the AC cord hook ③.
4. Remove the Back Cabinet in the direction of arrow.

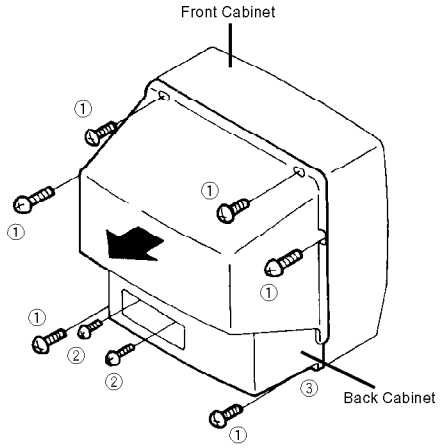


Fig. 1-1

1-2: CRT PCB (Refer to Fig. 1-2)

CAUTION: BEFORE REMOVING THE ANODE CAP, DISCHARGE ELECTRICITY BECAUSE IT CONTAINS HIGH VOLTAGE. BEFORE ATTEMPTING TO REMOVE OR REPAIR ANY PCB, UNPLUG THE POWER CORD FROM THE AC SOURCE.

1. Remove the Anode Cap. (Refer to REMOVAL OF ANODE CAP)
2. Disconnect the following connectors: (CP802 and CP805).
3. Remove the CRT PCB in the direction of arrow.

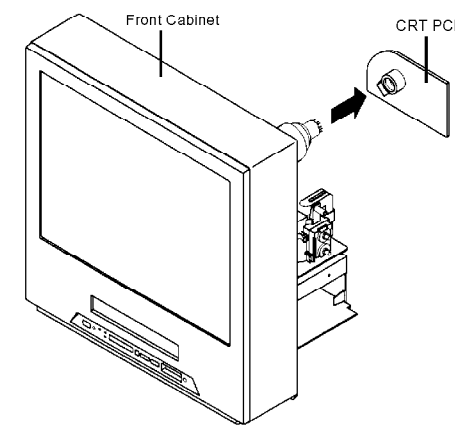


Fig. 1-2

1-3: TV/VCR BLOCK (Refer to Fig. 1-3)

1. Remove the 2 screws ①.
2. Disconnect the following connectors: (CP401, CP502, CP4201 and CP4202).
3. Unlock the support ②.
4. Remove the TV/VCR Block in the direction of arrow.

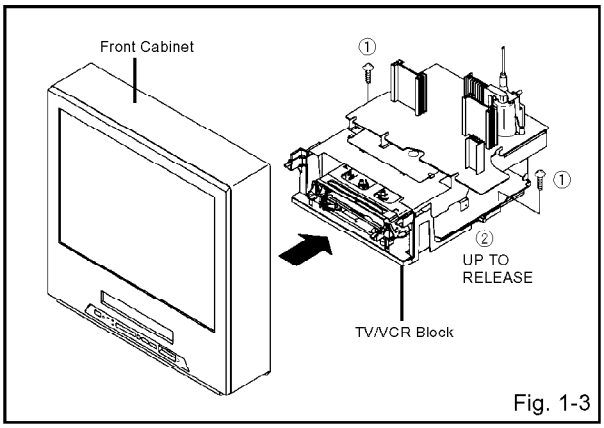


Fig. 1-3

1-4: MAIN PCB (Refer to Fig. 1-4)

1. Remove the screw ①.
2. Remove the Main PCB Holder.
3. Remove the 2 screws ②.
4. Remove the 3 screws ③.
5. Disconnect the following connectors: (CP810A, CP820A and CP402).
6. Remove the Main PCB in the direction of arrow.

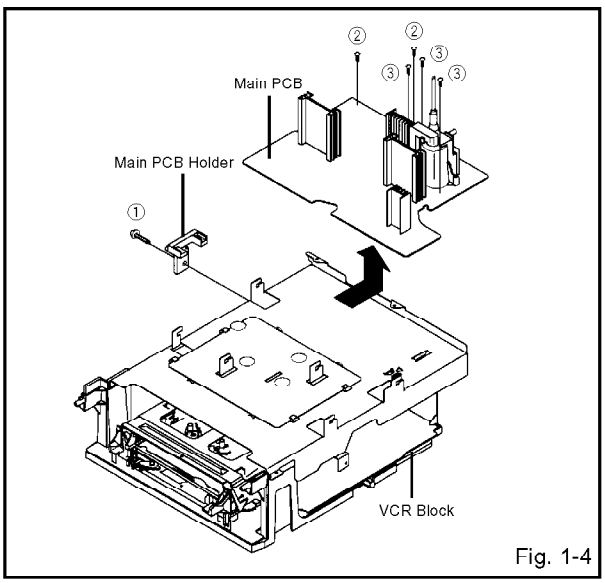


Fig. 1-4

DISASSEMBLY INSTRUCTIONS

1-5: DECK SHIELD PLATE (Refer to Fig. 1-5)

1. Remove the 2 screws ①.
2. Remove the screw ②.
3. Remove the Deck Shield Plate in the direction of arrow.

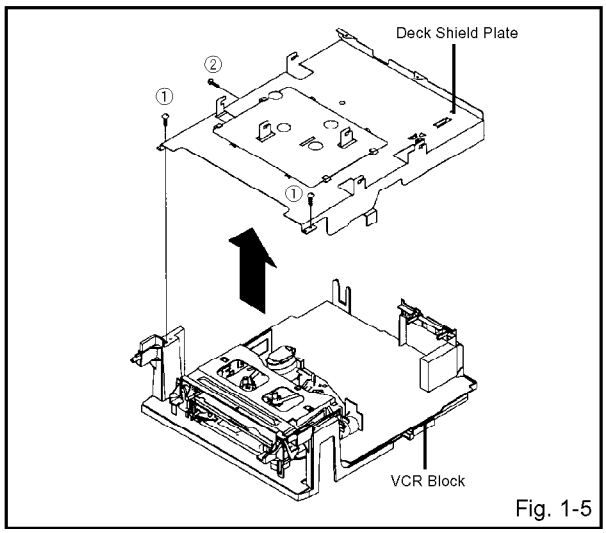


Fig. 1-5

1-6: DECK CHASSIS (Refer to Fig. 1-6)

1. Remove the 3 screws ①.
2. Disconnect the following connectors: (CP1004, CP1005, CP1006, CP4001, CP4002 and CP4003).
3. Remove the Deck Chassis in the direction of arrow.

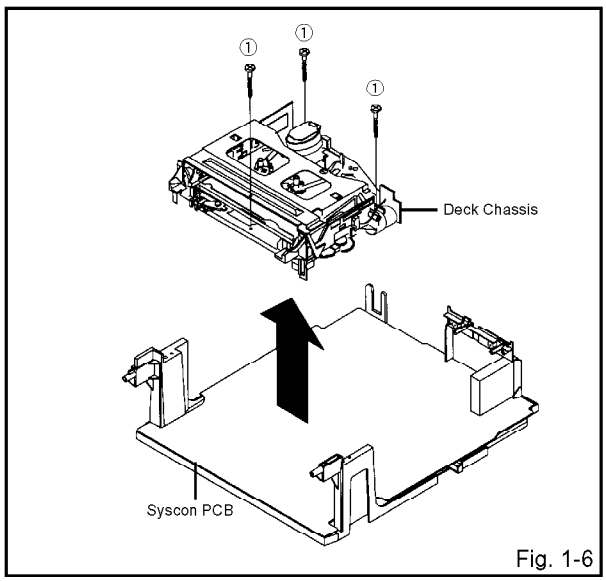


Fig. 1-6

1-7: JACK PLATE AND SYSCON PCB (Refer to Fig. 1-7)

1. Remove the screw ①.
2. Remove the Syscon PCB in the direction of arrow (A).
3. Remove the 2 screws ②.
4. Unlock the 2 supports ③.
5. Remove the Jack Plate in the direction of arrow (B).

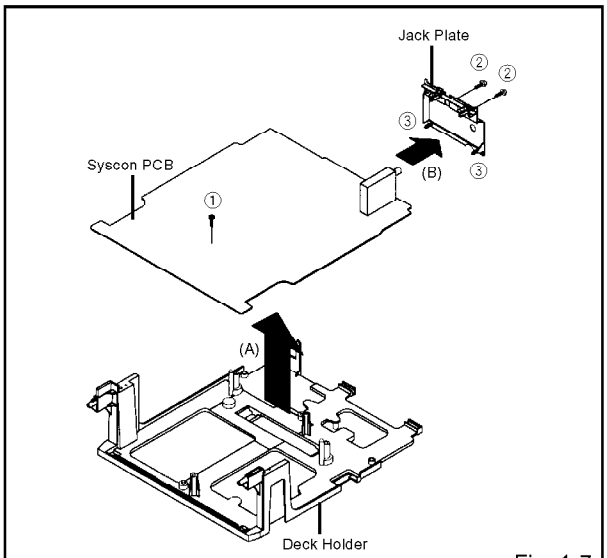


Fig. 1-7

DISASSEMBLY INSTRUCTIONS

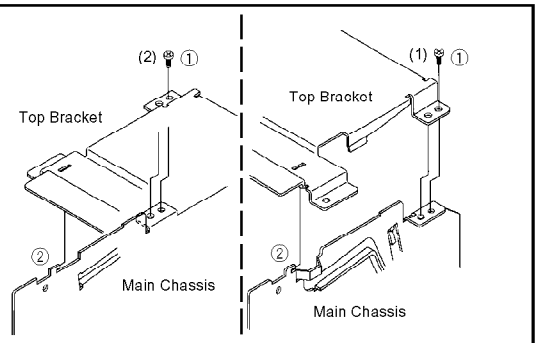
2. REMOVAL OF DECK PARTS

2-1: TOP BRACKET (Refer to Fig. 2-1)

1. Remove the 2 screws ①.
2. Slide the 2 supports ② and remove the Top Bracket.

NOTE

When you install the Top Bracket, install the screw (1) first, then install the screw (2).



• Screw Torque: 5 ± 0.5kgf•cm

Fig. 2-1

2-2: FLAP LEVER/TAPE GUIDE R (Refer to Fig. 2-2)

1. Move the Cassette Holder Ass'y to the back side.
2. Remove the Polyslider Washer ①.
3. Remove the Flap Lever.
4. Unlock the 3 supports ② and remove the Tape Guide R.

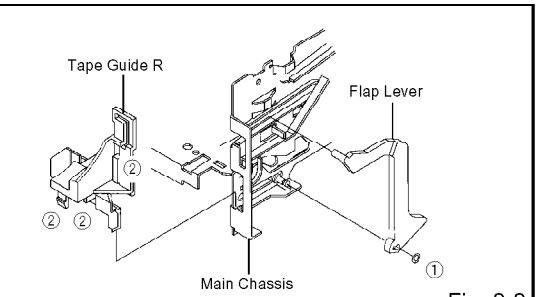
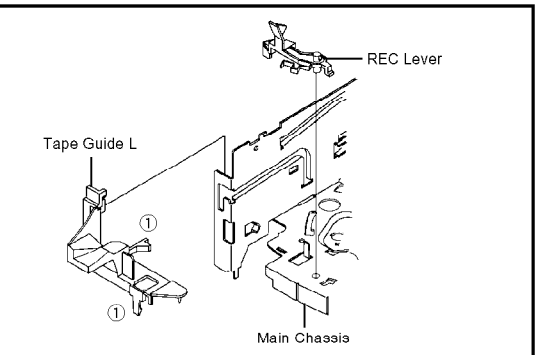


Fig. 2-2

2-3: TAPE GUIDE L (Refer to Fig. 2-3-A)

1. Move the Cassette Holder Ass'y to the back side.
2. Unlock the 2 supports ① and remove the Tape Guide L.
3. Remove the REC Lever. (Recorder only)

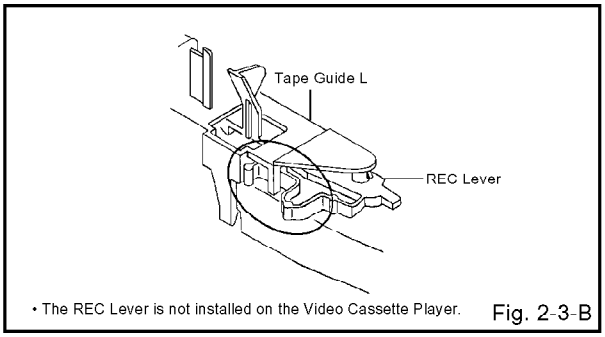


• The REC Lever is not installed on the Video Cassette Player.

Fig. 2-3-A

NOTE

When you install the Tape Guide L, install as shown in the circle of Fig. 2-3-B. **(Refer to Fig. 2-3-B)**



• The REC Lever is not installed on the Video Cassette Player.

Fig. 2-3-B

2-4: CASSETTE HOLDER ASS'Y (Refer to Fig. 2-4)

1. Move the Cassette Holder Ass'y to the front side so that the Link Ass'y doesn't slip out.
2. Push the Locker R to remove the Cassette Side R.
3. Remove the Cassette Side L.

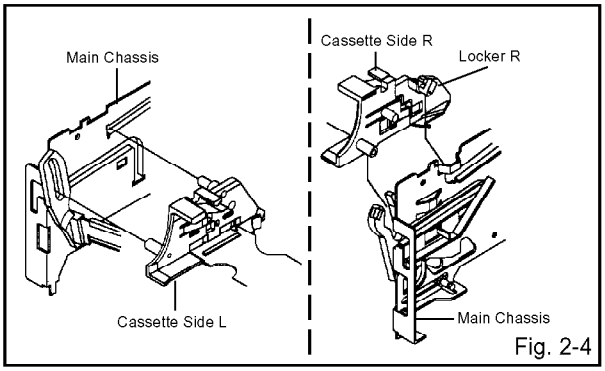


Fig. 2-4

2-5: CASSETTE SIDE L/R (Refer to Fig. 2-5)

1. Unlock the 4 supports ① and then remove the Cassette Side L/R.
2. Remove the Cassette Earth Spring.

NOTE

1. When you install the Cassette Side R, be sure to move the Locker R after installing.
2. After the installation of the Cassette Holder, then install the Cassette Earth Spring.

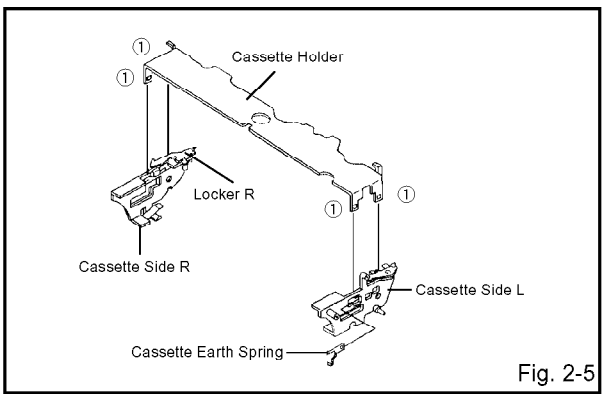


Fig. 2-5

DISASSEMBLY INSTRUCTIONS

2-6: LINK UNIT (Refer to Fig. 2-6)

1. Set the Link Unit to the Eject position.
2. Remove the (A) side of the Link Unit first, then remove the (B) side.

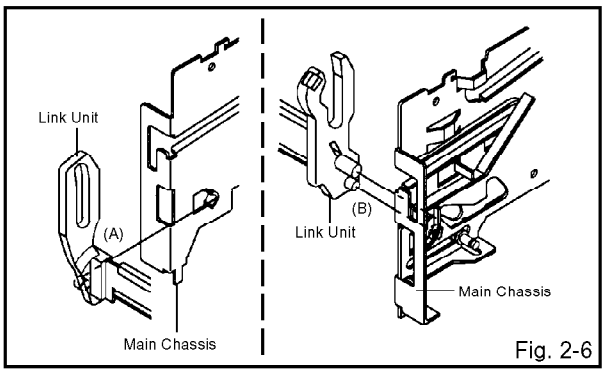


Fig. 2-6

2-7: LOADING MOTOR ASS'Y (Refer to Fig. 2-7)

1. Remove the Link Lever.
2. Remove the screw ①.
3. Remove the Loading Motor Ass'y.
4. Unlock the 2 supports ② and remove the Deck PCB (BOT).

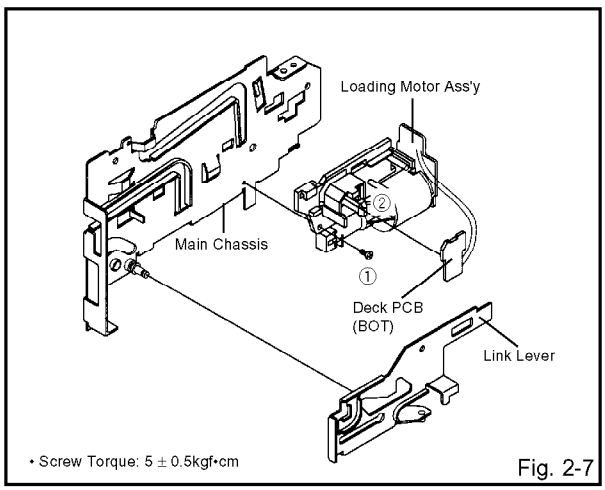


Fig. 2-7

2-8: SENSOR COVER L3 (Refer to Fig. 2-8)

1. Unlock the support ① and remove the Sensor Cover L3.

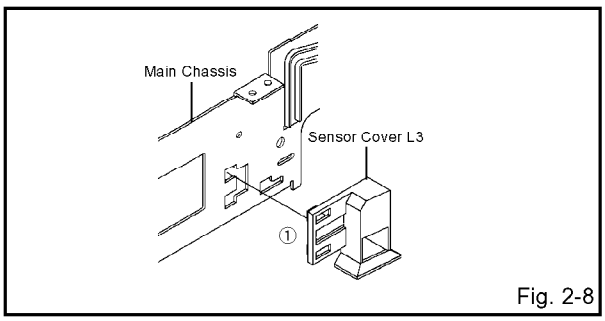


Fig. 2-8

2-9: TENSION ASS'Y (Refer to Fig. 2-9-B)

1. Turn the Middle Gear clockwise so that the Tension Holder hook, is set to the position of Fig. 2-9-A to more the Tension Arm Ass'y.
2. Remove the Tension Spring.
3. Unlock the support ① and remove the Tension Arm Ass'y.
4. Remove the Tension Adjust.
5. Unlock the 2 supports ② and remove the Tension Band Ass'y.
6. Float the hook ③ and turn it clockwise then remove the Tension Holder.
7. Remove the SS Brake Spring.
8. Remove the SS Arm Brake.

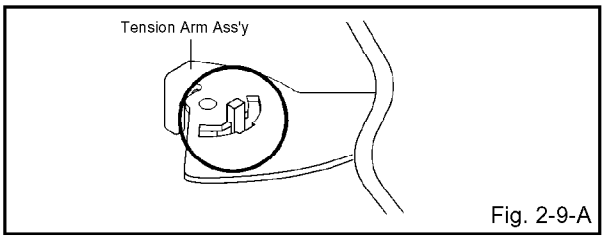


Fig. 2-9-A

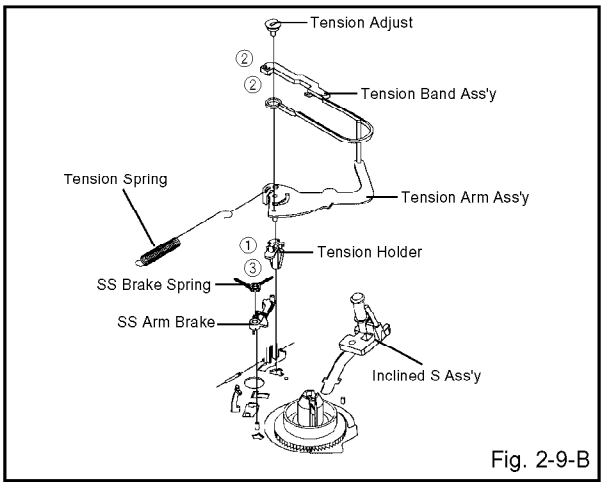


Fig. 2-9-B

NOTE

When you install the Tension Adjust, install as shown in Fig. 2-9-C. **(Refer to Fig. 2-9-C)**

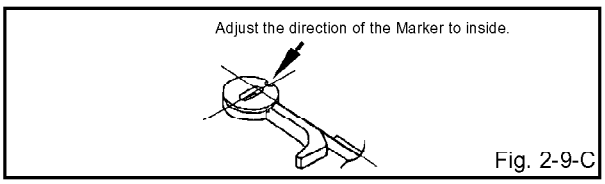


Fig. 2-9-C

DISASSEMBLY INSTRUCTIONS

2-10: T BRAKE ASS'Y (Refer to Fig. 2-10)

1. Remove the T Brake Spring.
2. Turn the T Brake Ass'y clockwise and bend the hook section to remove it.

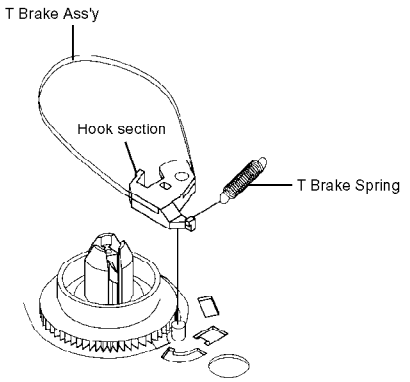


Fig. 2-10

2-11: S REEL/T REEL (Refer to Fig. 2-11)

1. Remove the S Reel and T Reel.
2. Remove the 2 Polyslider Washers ①.

NOTE

1. Take care not to damage the gears of the S Reel and T Reel.
2. The Polyslider Washer may be remained on the back of the reel.
3. Take care not to damage the shaft.
4. Do not touch the section "A" of S Reel and T Reel. (Use gloves.) **(Refer to Fig. 2-11)** Do not adhere the stains on it.
5. When you install the reel, clean the shaft and oil it. (If you do not oil, noise may be heard in FF/REW mode.)
6. After installing the reel, adjust the height of the reel. **(Refer to MECHANICAL ADJUSTMENT)**

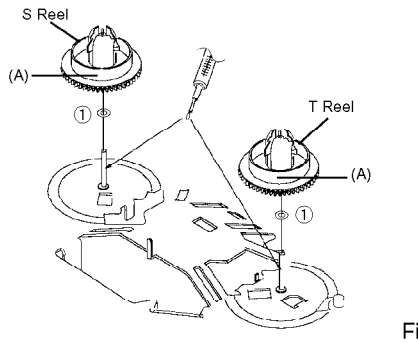


Fig. 2-11

2-12: PINCH ROLLER BLOCK/P5-3 ARM ASS'Y (Refer to Fig. 2-12-A)

1. Remove the P5 Spring.
2. Remove the screw ①.
3. Unlock the 2 supports ② and remove the Cassette Opener.
4. Remove the Pinch Roller Block, Pinch Roller Arm Spring, Pinch Roller Lever Ass'y and P5-3 Arm Ass'y.

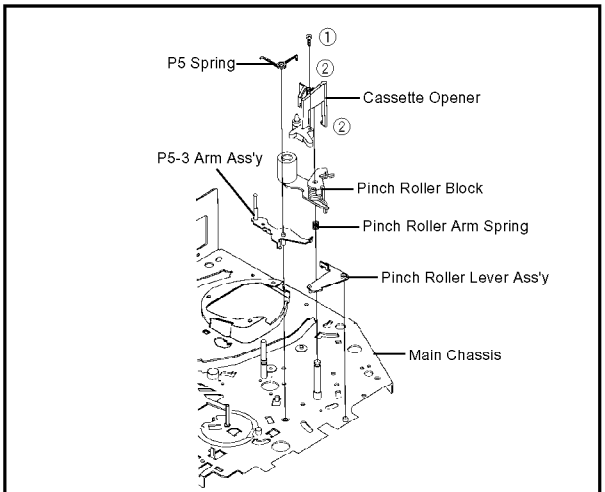


Fig. 2-12-A

NOTE

1. Do not touch the Pinch Roller. (Use gloves.)
2. When you install the Pinch Roller Block, install as shown in the circle of Fig. 2-12-B. **(Refer to Fig. 2-12-B)**

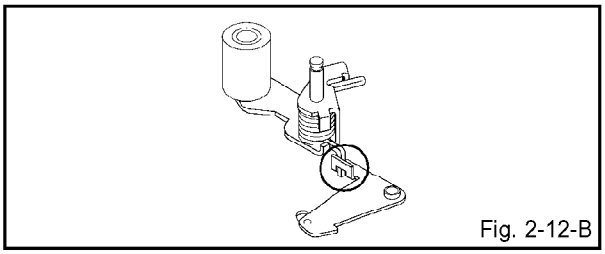


Fig. 2-12-B

2-13: A/C HEAD (Refer to Fig. 2-13-A)

1. Remove the screw ①.
2. Remove the A/C Head Base.
3. Remove the 3 screws ②.
4. Remove the A/C Head and A/C Head Spring.

NOTE

1. Do not touch the A/C Head. (Use gloves.)
2. When you install the A/C Head Spring, install as shown in Fig. 2-13-B. **(Refer to Fig. 2-13-B)**
3. When you install the A/C Head, tighten the screw (1) first, then tighten the screw (2), finally tighten the screw (3).

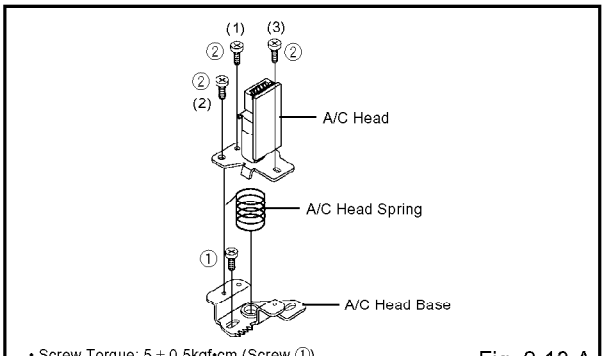


Fig. 2-13-A

DISASSEMBLY INSTRUCTIONS

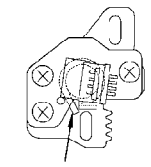
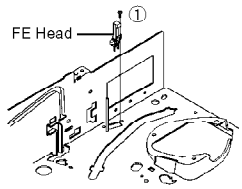


Fig. 2-13-B

2-14: FE HEAD (RECORDER ONLY) (Refer to Fig. 2-14)

1. Remove the screw ①.
2. Remove the FE Head.



• The FE Head is not installed on the Video Cassette Player.
• Screw Torque: 4 ± 0.5kgf•cm

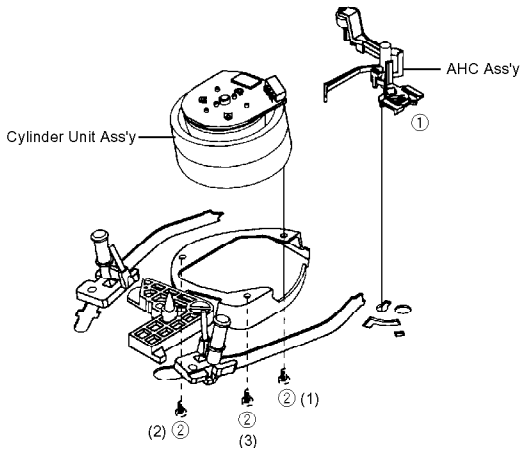
Fig. 2-14

2-15: AHC ASS'Y/CYLINDER UNIT ASS'Y (Refer to Fig. 2-15)

1. Unlock the support ① and remove the AHC Ass'y.
2. Remove the 3 screws ②.
3. Remove the Cylinder Unit Ass'y.

NOTE

When you install the Cylinder Unit Ass'y, tighten the screws from (1) to (3) in order while pulling the Ass'y toward the left front direction.

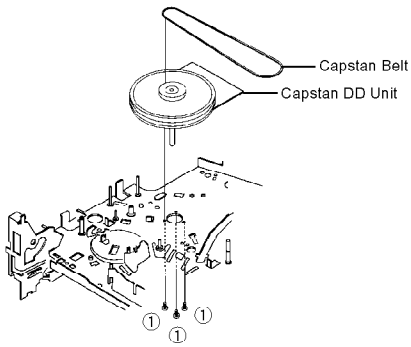


• Screw Torque: 3 ± 0.5kgf•cm

Fig. 2-15

2-16: CAPSTAN DD UNIT (Refer to Fig. 2-16)

1. Remove the Capstan Belt.
2. Remove the 3 screws ①.
3. Remove the Capstan DD Unit.



• Screw Torque: 5 ± 0.5kgf•cm

Fig. 2-16

2-17: MIDDLE GEAR/MAIN CAM (Refer to Fig. 2-17-A)

1. Remove the Polyslider Washer ①, then remove the Middle Gear.
2. Remove the E-Ring, then remove the Main Cam, P5 Cam, Pinch Roller Cam and Joint Gear.

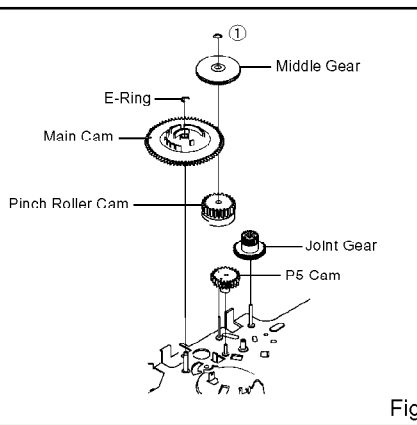


Fig. 2-17-A

NOTE

When you install the Pinch Roller Cam, P5 Cam and Main Cam, align each marker. **(Refer to Fig. 2-17-B)**

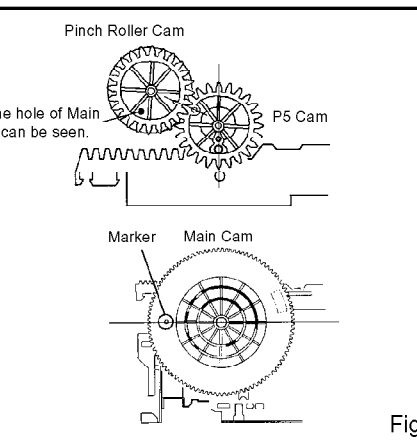


Fig. 2-17-B

DISASSEMBLY INSTRUCTIONS

2-18: CLUTCH ASS'Y (Refer to Fig. 2-18)

1. Remove the Capstan Brake Spring.
2. Remove the Polyslider Washer ①.
3. Remove the Clutch Ass'y, Ring Spring and Coupling Gear.
4. Unlock the 2 supports ② and remove the Clutch Lever.

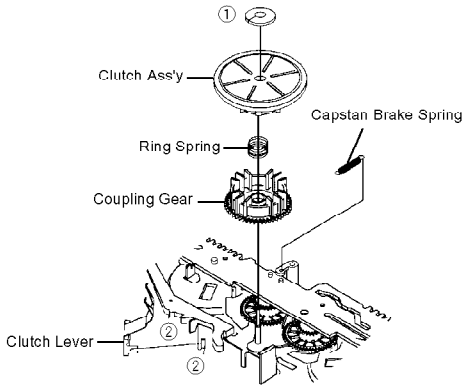


Fig. 2-18

2-19: LOADING GEAR S/T ASS'Y (Refer to Fig. 2-19-A)

1. Remove the E-Ring ① and remove the Main Loading Gear.
2. Slide the Main Rod and remove the Spring Holder.
3. Remove the Main Rod, Tension Lever, Clutch Actuator, Idler Arm Ass'y.
4. Remove the screw ②.
5. Remove the LED Reflecter.
6. Remove the Loading Arm S Ass'y and Loading Arm T Ass'y.
7. Remove the Loading Gear S and Loading Gear T.
8. Remove the Loading Gear Spring.

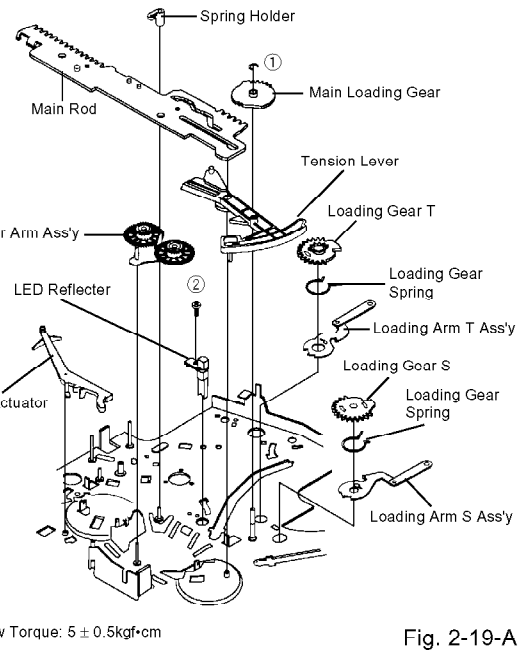


Fig. 2-19-A

NOTES

1. When you install the Loading Arm S Ass'y, Loading Arm T Ass'y and Main Loading Gear, align each marker. **(Refer to Fig. 2-19-B)**

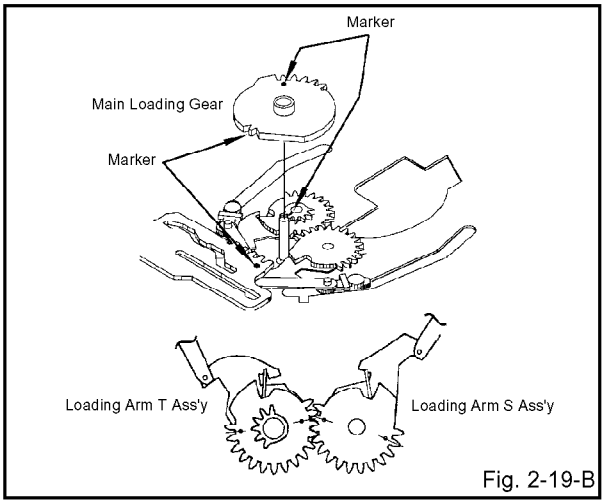


Fig. 2-19-B

2. When you install the Clutch Actuator, install as shown in the circle of Fig. 2-19-C. **(Refer to Fig. 2-19-C)**

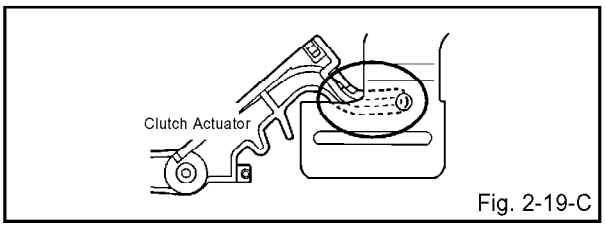


Fig. 2-19-C

2-20: INCLINED S/T ASS'Y (Refer to Fig. 2-20)

1. Remove the Cap P4.
2. Remove the screw ①.
3. Unlock the support ② and remove the Loading Gear Holder.
4. Remove the Inclined S Unit.
5. Remove the Inclined T Unit.

NOTE

Do not touch the roller of Guide Roller.

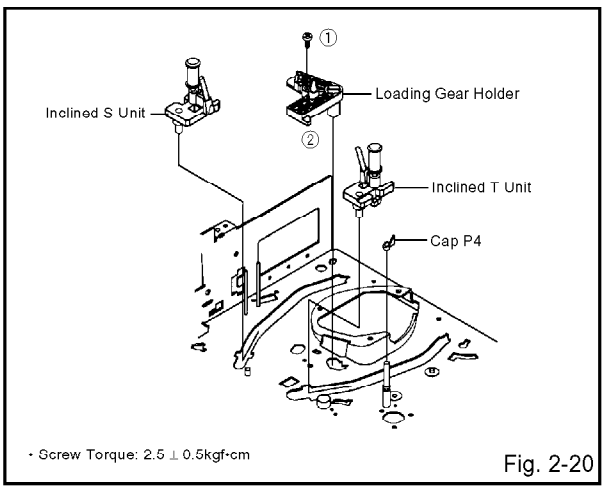


Fig. 2-20

DISASSEMBLY INSTRUCTIONS

3. REMOVAL OF ANODE CAP

Read the following **NOTED** items before starting work.

* After turning the power off there might still be a potential voltage that is very dangerous. When removing the Anode Cap, make sure to discharge the Anode Cap's potential voltage.
* Do not use pliers to loosen or tighten the Anode Cap terminal, this may cause the spring to be damaged.

REMOVAL

1. Follow the steps as follows to discharge the Anode Cap. **(Refer to Fig. 3-1.)**
   Connect one end of an Alligator Clip to the metal part of a flat-blade screwdriver and the other end to ground.
   While holding the plastic part of the insulated Screwdriver, touch the support of the Anode with the tip of the Screwdriver.
   A cracking noise will be heard as the voltage is discharged.

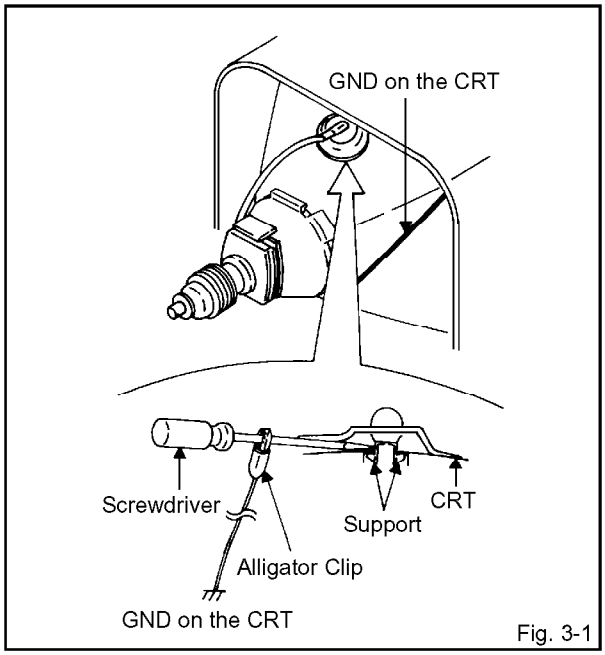


Fig. 3-1

2. Flip up the sides of the Rubber Cap in the direction of the arrow and remove one side of the support. **(Refer to Fig. 3-2.)**

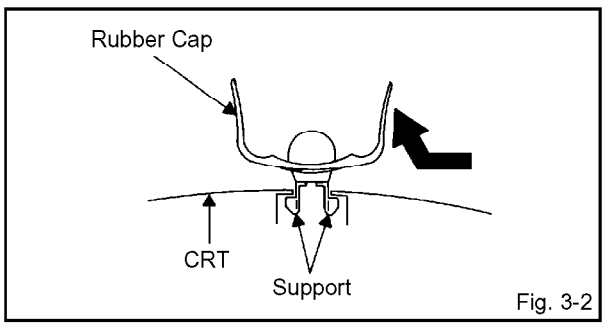


Fig. 3-2

3. After one side is removed, pull in the opposite direction to remove the other.

NOTE

Take care not to damage the Rubber Cap.

INSTALLATION

1. Clean the spot where the cap was located with a small amount of alcohol. **(Refer to Fig. 3-3.)**

NOTE

Confirm that there is no dirt, dust, etc. at the spot where the cap was located.

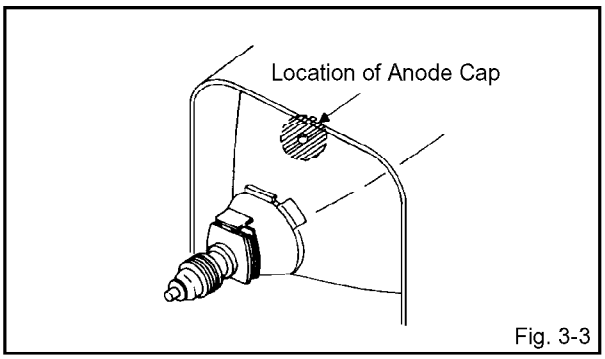


Fig. 3-3

2. Arrange the wire of the Anode Cap and make sure the wire is not twisted.
3. Turn over the Rubber Cap. **(Refer to Fig. 3-4.)**

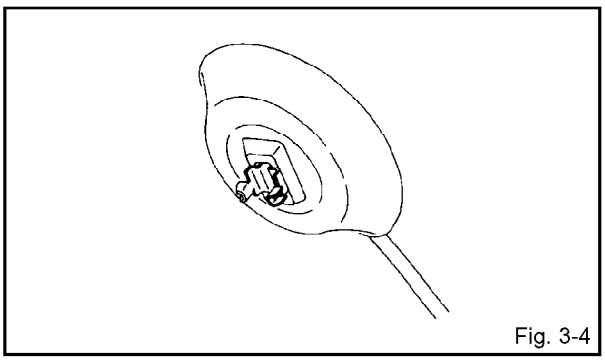


Fig. 3-4

4. Insert one end of the Anode Support into the anode button, then the other as shown in **Fig. 3-5**.

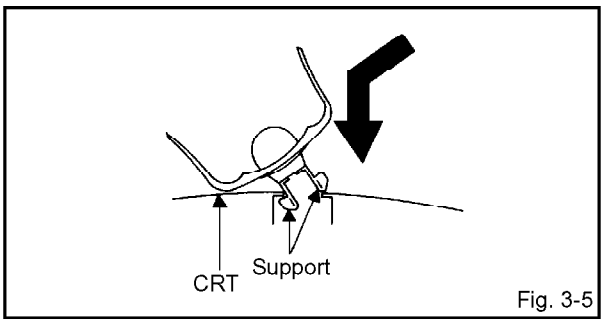


Fig. 3-5

5. Confirm that the Support is securely connected.
6. Put on the Rubber Cap without moving any parts.

DISASSEMBLY INSTRUCTIONS

4. REMOVAL AND INSTALLATION OF FLAT PACKAGE IC

REMOVAL

1. Put the Masking Tape (cotton tape) around the Flat Package IC to protect other parts from any damage. **(Refer to Fig. 4-1.)**

   NOTE

   Masking is carried out on all the parts located within 10 mm distance from IC leads.

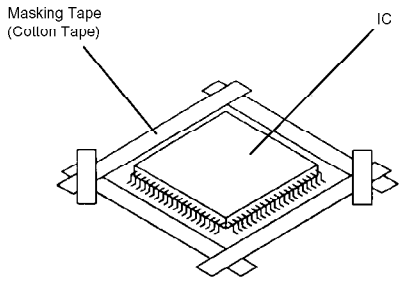


Fig. 4-1

2. Heat the IC leads using a blower type IC desoldering machine. **(Refer to Fig. 4-2.)**

   NOTE

   Do not add the rotating and the back and forth directions force on the IC, until IC can move back and forth easily after desoldering the IC leads completely.

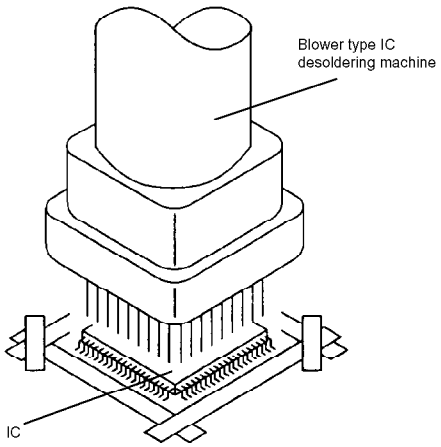


Fig. 4-2

3. When IC starts moving back and forth easily after desoldering completely, pickup the corner of the IC using a tweezers and remove the IC by moving with the IC desoldering machine. **(Refer to Fig. 4-3.)**

   NOTE

   Some ICs on the PCB are affixed with glue, so be careful not to break or damage the foil of each IC leads or solder lands under the IC when removing it.

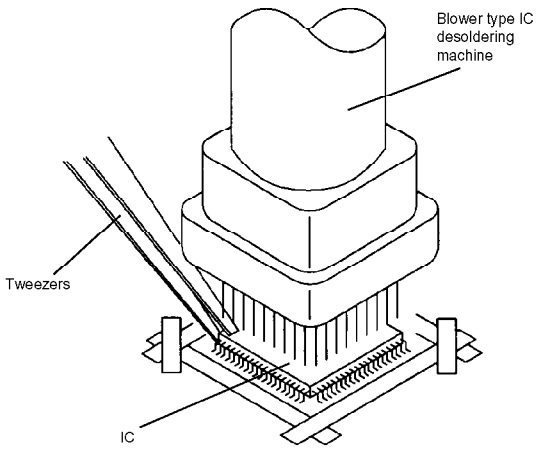


Fig. 4-3

4. Peel off the Masking Tape.

5. Absorb the solder left on the pattern using the Braided Shield Wire. **(Refer to Fig. 4-4.)**

   NOTE

   Do not move the Braided Shield Wire in the vertical direction towards the IC pattern.

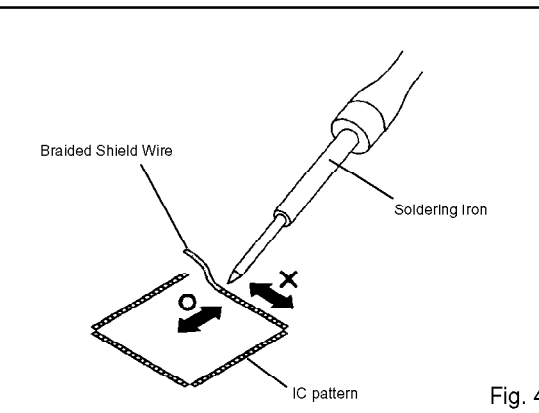


Fig. 4-4

DISASSEMBLY INSTRUCTIONS

INSTALLATION

1. Take care of the polarity of new IC and then install the new IC fitting on the printed circuit pattern. Then solder each lead on the diagonal positions of IC temporarily. **(Refer to Fig. 4-5.)**

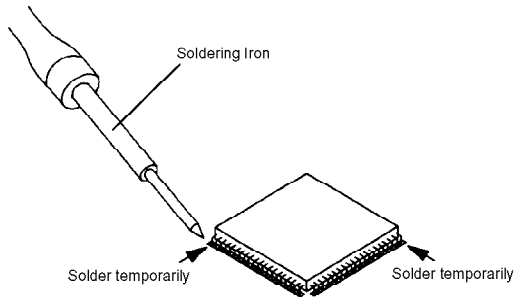


Fig. 4-5

2. Supply the solder from the upper position of IC leads sliding to the lower position of the IC leads. **(Refer to Fig. 4-6.)**

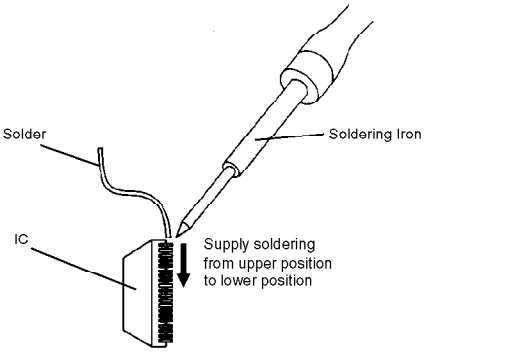


Fig. 4-6

3. Absorb the solder left on the lead using the Braided Shield Wire. **(Refer to Fig. 4-7.)**

   NOTE

   Do not absorb the solder to excess.

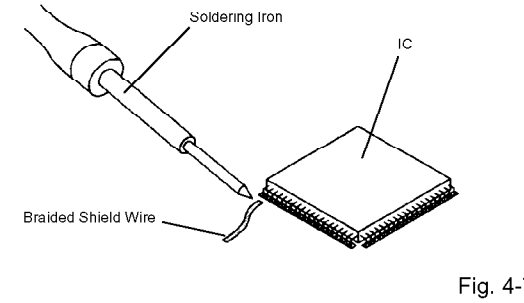


Fig. 4-7

4. When bridge-soldering between terminals and/or the soldering amount are not enough, resolder using a Thin-tip Soldering Iron. **(Refer to Fig. 4-8.)**

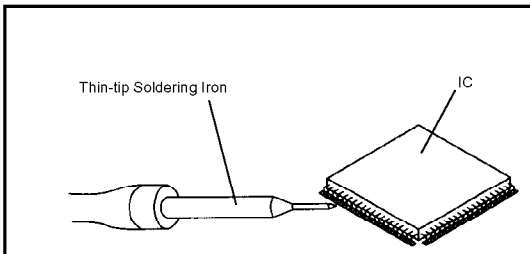


Fig. 4-8

5. Finally, confirm the soldering status on four sides of the IC using a magnifying glass.
   Confirm that no abnormality is found on the soldering position and installation position of the parts around the IC. If some abnormality is found, correct by resoldering.

   NOTE

   When the IC leads are bent during soldering and/or repairing, do not repair the bending of leads. If the bending of leads are repaired, the pattern may be damaged. So, be always sure to replace the IC in this case.

KEY TO ABBREVIATIONS

A	A/C	:	Audio/Control
	ACC	:	Automatic Color Control
	AE	:	Audio Erase
	AFC	:	Automatic Frequency Control
	AFT	:	Automatic Fine Tuning
	AFT DET	:	Automatic Fine Tuning Detect
	AGC	:	Automatic Gain Control
	AMP	:	Amplifier
	ANT	:	Antenna
	A.PB	:	Audio Playback
	APC	:	Automatic Phase Control
	ASS'Y	:	Assembly
	AT	:	All Time
	AUTO	:	Automatic
	A/V	:	Audio/Video
B	BGP	:	Burst Gate Pulse
	BOT	:	Beginning of Tape
	BPF	:	Bandpass Filter
	BRAKE SOL	:	Brake Solenoid
	BUFF	:	Buffer
	B/W	:	Black and White
C	C	:	Capacitance, Collector
	CASE	:	Cassette
	CAP	:	Capstan
	CARR	:	Carrier
	CH	:	Channel
	CLK	:	Clock
	CLOCK (SY-SE)	:	Clock (Syscon to Servo)
	COMB	:	Combination, Comb Filter
	CONV	:	Converter
	CPM	:	Capstan Motor
	CTL	:	Control
	CYL	:	Cylinder
	CYL-M	:	Cylinder-Motor
	CYL SENS	:	Cylinder-Sensor
D	DATA (SY-CE)	:	Data (Syscon to Servo)
	dB	:	Decibel
	DC	:	Direct Current
	DD Unit	:	Direct Drive Motor Unit
	DEMOD	:	Demodulator
	DET	:	Detector
	DEV	:	Deviation
E	E	:	Emitter
	EF	:	Emitter Follower
	EMPH	:	Emphasis
	ENC	:	Encoder
	ENV	:	Envelope
	EOT	:	End of Tape
	EQ	:	Equalizer
	EXT	:	External
F	F	:	Fuse
	FBC	:	Feed Back Clamp
	FE	:	Full Erase
	FF	:	Fast Forward, Flipflop
	FG	:	Frequency Generator
	FL SW	:	Front Loading Switch
	FM	:	Frequency Modulation
	FSC	:	Frequency Sub Carrier
	FWD	:	Forward
G	GEN	:	Generator
	GND	:	Ground
H	H.P.F	:	High Pass Filter
	H.SW	:	Head Switch
	Hz	:	Hertz
I	IC	:	Integrated Circuit
	IF	:	Intermediate Frequency
	IND	:	Indicator
	INV	:	Inverter
K	KIL	:	Killer
L	L	:	Left
	LED	:	Light Emitting Diode
	LIMIT AMP	:	Limiter Amplifier
	LM, LDM	:	Loading Motor
	LP	:	Long Play
	L.P.F	:	Low Pass Filter
	LUMI.	:	Luminance
M	M	:	Motor
	MAX	:	Maximum
	MINI	:	Minimum
	MIX	:	Mixer, mixing
	MM	:	Monostable Multivibrator
	MOD	:	Modulator, Modulation
	MPX	:	Multiplexer, Multiplex
	MS SW	:	Mecha State Switch
N	NC	:	Non Connection
	NR	:	Noise Reduction
O	OSC	:	Oscillator
	OPE	:	Operation
P	PB	:	Playback
	PB CTL	:	Playback Control
	PB-C	:	Playback-Chrominance
	PB-Y	:	Playback-Luminance
	PCB	:	Printed Circuit Board
	P. CON	:	Power Control
	PD	:	Phase Detector
	PG	:	Pulse Generator
	P-P	:	Peak-to Peak
R	R	:	Right
	REC	:	Recording
	REC-C	:	Recording-Chrominance
	REC-Y	:	Recording-Luminance
	REEL BRK	:	Reel Brake
	REEL S	:	Reel Sensor
	REF	:	Reference
	REG	:	Regulated, Regulator
	REW	:	Rewind
	REV, RVS	:	Reverse
	RF	:	Radio Frequency
	RMC	:	Remote Control
	RY	:	Relay
S	S. CLK	:	Serial Clock
	S. COM	:	Sensor Common
	S. DATA	:	Serial Data
	SEG	:	Segment
	SEL	:	Select, Selector
	SENS	:	Sensor
	SER	:	Search Mode
	SI	:	Serial Input
	SIF	:	Sound Intermediate Frequency
	SO	:	Serial Output
	SOL	:	Solenoid
	SP	:	Standard Play
	STB	:	Serial Strobe
	SW	:	Switch

KEY TO ABBREVIATIONS

S	**SYNC**	:	Synchronization
	SYNC SEP	:	Sync Separator, Separation
T	**TR**	:	Transistor
	TRAC	:	Tracking
	TRICK PB	:	Trick Playback
	TP	:	Test Point
U	**UNREG**	:	Unregulated
V	**V**	:	Volt
	VCO	:	Voltage Controlled Oscillator
	VIF	:	Video Intermediate Frequency
	VP	:	Vertical Pulse, Voltage Display
	V.PB	:	Video Playback
	VR	:	Variable Resistor
	V.REC	:	Video Recording
	VSF	:	Visual Search Fast Forward
	VSR	:	Visual Search Rewind
	VSS	:	Voltage Super Source
	V-SYNC	:	Vertical-Synchronization
	VT	:	Voltage Tuning
X	**X'TAL**	:	Crystal
Y	**Y/C**	:	Luminance/Chrominance

SERVICE MODE LIST

This unit provided with the following SERVICE MODES so you can repair, examine and adjust easily.

To enter SERVICE MODE, unplug AC cord till lost actual clock time. Then press and hold Vol (-) button of main unit and remocon key simultaneously.

The both pressing of set key and remote control key will not be possible if clock has been set. To reset clock, either unplug AC cord and allow at least 5 seconds before Power On.

Set Key	Remocon Key	Operations
VOL. (-) MIN	0	Releasing of V-CHIP PASSWORD.
VOL. (-) MIN	1	Initialization of the factory. NOTE: Do not use this for the normal servicing.
VOL. (-) MIN	2	Horizontal position adjustment of OSD. NOTE: Also can be adjusted by using the Adjustment MENU. Refer to the "ELECTRICAL ADJUSTMENT" (OSD HORIZONTAL).
VOL. (-) MIN	3	Adjust the PG SHIFTER automatically. Refer to the "ELECTRICAL ADJUSTMENT" (PG SHIFTER).
VOL. (-) MIN	4	Adjust the PG SHIFTER manually. Refer to the "ELECTRICAL ADJUSTMENT" (PG SHIFTER).
VOL. (-) MIN	5	Adjusting of the Tracking to the center position. NOTE: Also can be adjusted by pressing the ATR button for more than 2 seconds during PLAY.
VOL. (-) MIN	6	POWER ON total hours and PLAY/REC total hours are displayed on the screen. Refer to the "PREVENTIVE CHECKS AND SERVICE INTERVALS" (CONFIRMATION OF USING HOURS). Can be checked of the INITIAL DATA of MEMORY IC. Refer to the "NOTE FOR THE REPLACING OF MEMORY IC".
VOL. (-) MIN	8	Writing of EEPROM initial data. NOTE: Do not use this for the normal servicing.
VOL. (-) MIN	9	Display of the Adjustment MENU on the screen. Refer to the "ELECTRICAL ADJUSTMENT" (On-Screen Display Adjustment).

Method	Operations
Press the ATR button on the remote control for more than 2 seconds during PLAY.	Adjusting of the Tracking to the center position. Refer to the "MECHANICAL ADJUSTMENT" (GUIDE ROLLER) and "ELECTRICAL ADJUSTMENT" (PG SHIFTER).
Make the short circuit between the test point of SERVICE and the GND.	The EOT/BOT/Reel sensor do not work at this moment. Refer to the "PREPARATION FOR SERVICING"

PREVENTIVE CHECKS AND SERVICE INTERVALS

The following standard table depends on environmental conditions and usage. Unless maintenance is properly carried out, the following service intervals may be quite shortened as harmful effects may be had on other parts. Also, long term storage or misuse may cause transformation and aging of rubber parts.

Time / Parts Name	500 hours	1,000 hours	1,500 hours	2,000 hours	3,000 hours	Notes
Audio Control Head	■	■	■	■	■	Clean those parts in contact with the tape.
Full Erase Head (Recorder only)	■	■	■	■	■	
Capstan Belt			■	■	●	Clean the rubber, and parts which the rubber touches.
Pinch Roller	■	■	■	■	■ ●	
Capstan DD Unit					●	
Loading Motor					●	
Tension Band					●	
Capstan Shaft	■	■	■	■	■	
Tape Running Guide Post	■	■	■	■	■	Replace when rolling becomes abnormal.
Cylinder Unit	■	■	■	■	●	Clean the Head

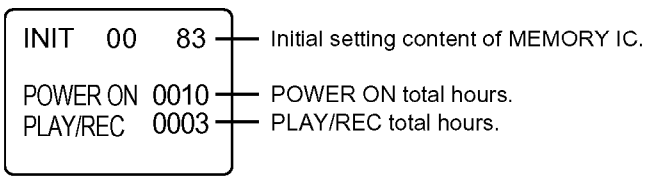
■ : Clean
● : Replace

CONFIRMATION OF USING HOURS

POWER ON total hours and PLAY/REC total hours can be checked on the screen.
Total hours are displayed in 16 system of notation.

NOTE: The confirmation of using hours will not be possible if clock has been set. To reset clock, either unplug AC cord and allow at least 5 seconds before Power On.

1. Set the VOLUME to minimum.
2. While holding down VOLUME button on front cabinet, press key 6 on remote control simultaneously.
3. After the confirmation of using hours, turn off the power.



(16 x 16 x 16 x thousands digit value) + (16 x 16 x hundreds digit value) + (16 x tens digit value) + (ones digit value)

PREVENTIVE CHECKS AND SERVICE INTERVALS

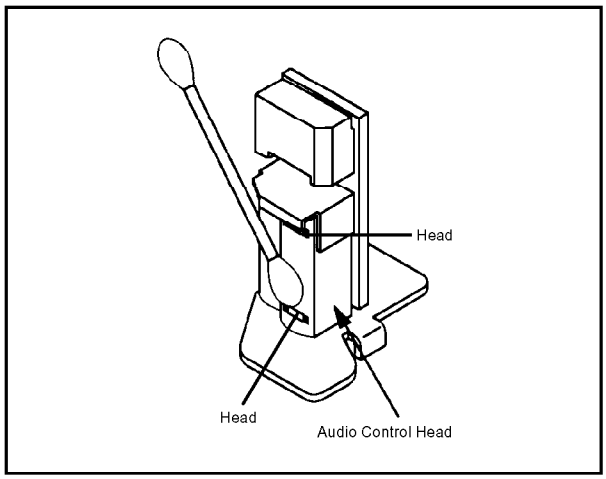
CLEANING

NOTE

After cleaning the heads with isopropyl alcohol, do not run a tape until the heads dry completely. If the heads are not completely dry and alcohol gets on the tape, damage may occur.

1. AUDIO CONTROL HEAD

Clean the Audio Control Head with the cotton stick soaked by alcohol. Clean the full erase head in the same manner. **(Refer to the figure below.)**



2. TAPE RUNNING SYSTEM

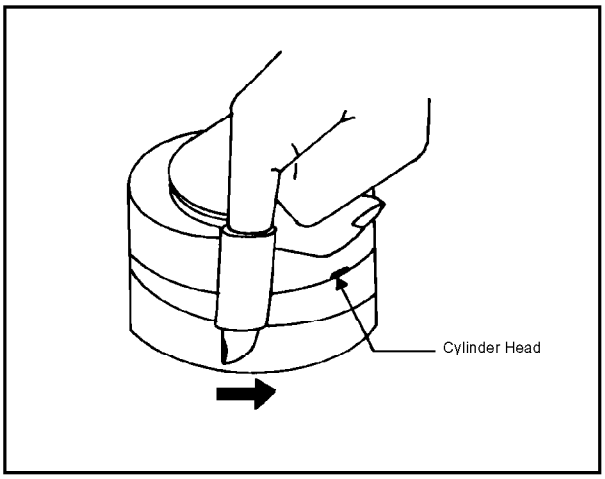
When cleaning the tape transport system, use the gauze moistened with isopropyl alcohol.

3. CYLINDER

Wrap a piece of chamois around your finger. Dip it in isopropyl alcohol. Hold it to the cylinder head softly. Turn the cylinder head counterclockwise to clean it (in the direction of the arrow). **(Refer to the figure below.)**

NOTE

Do not exert force against the cylinder head. Do not move the chamois upward or downward on the head.
Use the chamois one by one.



NOTE FOR THE REPLACING OF MEMORY IC

If a service repair is undertaken where it has been required to change the MEMORY IC, the following steps should be taken to ensure correct data settings while making reference to TABLE 1.

NOTE: Initial Data setting will not be possible if clock has been set. To reset clock, either unplug AC cord and allow at least 5 seconds before Power On.

INI	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+A	+B	+C	+D	+E	+F
00	88	1B	82	67	C3	15	34	0B	51	9A	3C	96	19	4F	28	1A
10	BD	A4	9C	94	0C	00	30	05	08	00	A9	54	04	3E	14	00
20	06	3A	01	15	10	60	32	3A	D5	D2	62	24	66	08	28	68
30	29	69	2A	6A	6B	6C	6D	6E	6F	50	70	70	71	71	52	52
40	72	72	53	73	54	74	74	55	55	75	75	56	56	56	76	76
50	57	57	77	77	58	58	78	78	59	59	79	79	5A	5A	7A	7A
60	5B	5B	5C	5C	5D	5D	5E	5E	7E	7E	---	---	---	---	---	---

Table 1

1. Enter DATA SET mode by setting VOLUME to minimum.
2. While holding down VOLUME button on front cabinet, press key 6 on remote control simultaneously. ADDRESS and DATA should appear as FIG 1.

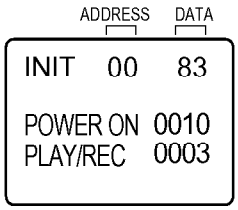
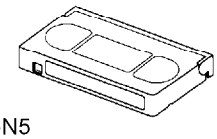
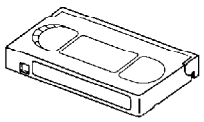
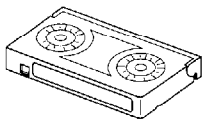
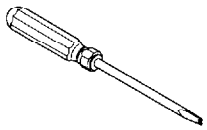
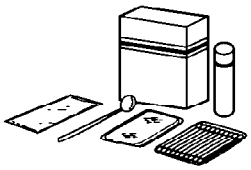
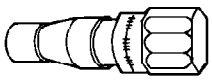
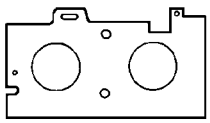
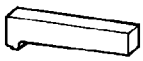
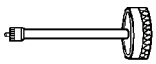
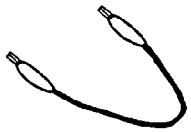
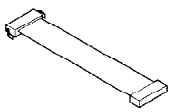
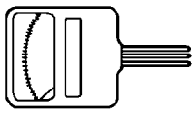


Fig. 1

3. ADDRESS is now selected and should "blink". Using the SET + or - keys on the remote, step through the ADDRESS until required ADDRESS to be changed is reached.
4. Press ENTER to select DATA. When DATA is selected, it will "blink".
5. Again, step through the DATA using SET + or - until required DATA value has been selected.
6. Pressing ENTER will take you back to ADDRESS for further selection if necessary.
7. Repeat steps 3 to 6 until all data has been checked.
8. When satisfied correct DATA has been entered, turn POWER off (return to STANDBY MODE) to finish DATA input.

The unit will now have the correct DATA for the new MEMORY IC.

SERVICING FIXTURES AND TOOLS

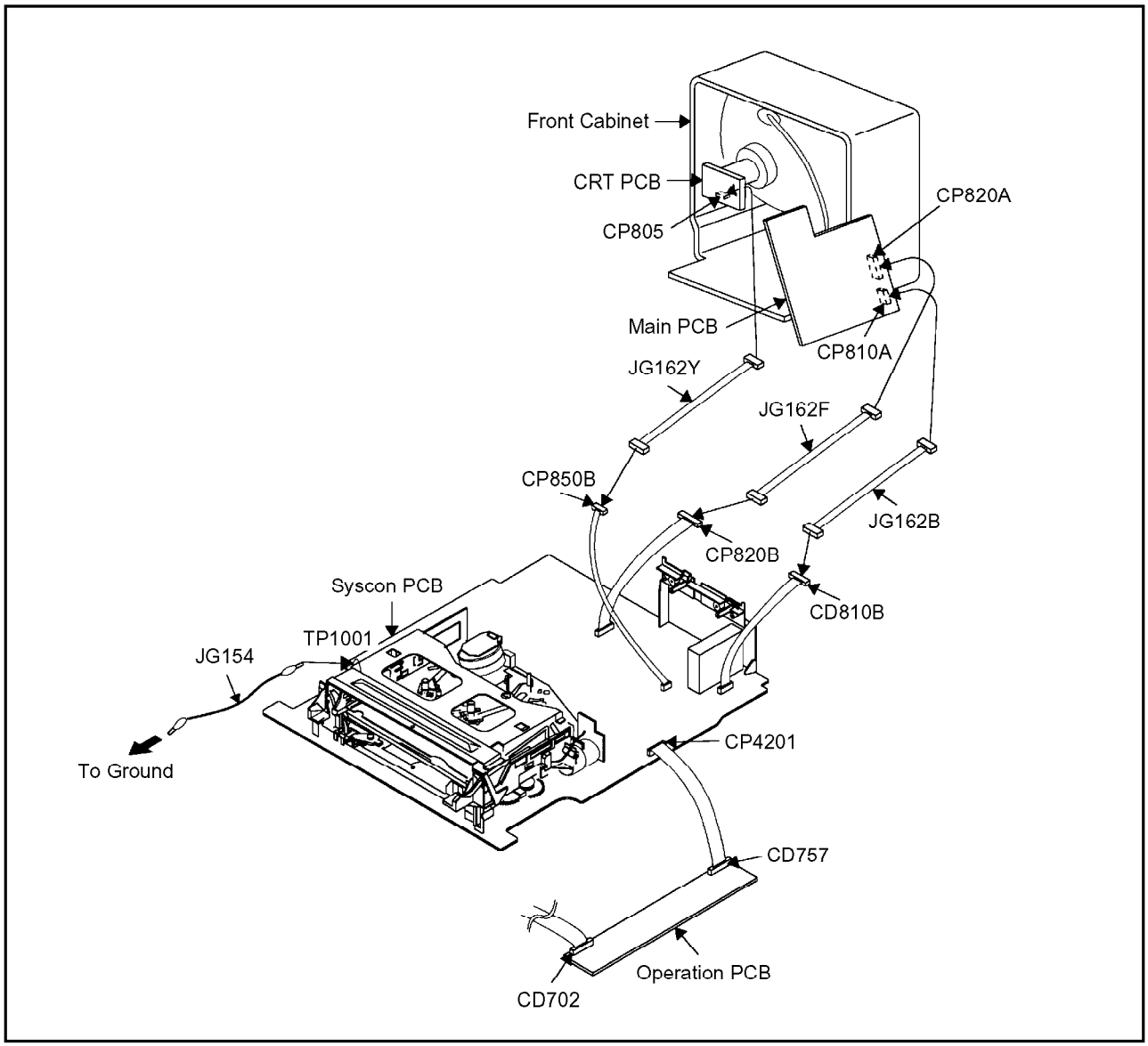
Alignment Tape  ST-N5 ST-NF	Back tension cassette gauge  70909103	Torque cassette gauge (KT-300NR)  70909199	Taper nut driver  70909228
VTR cleaning kit 	VTR lubrication kit 	Grease 	JG002B Adapter JG002E Dial Torque Gauge (10~90gf•cm) JG002F (60~600gf•cm) 
JG022 Master Plane 	JG024A Reel Disk Height Adjustment Jig 	JG153 X Value Adjustment Screwdriver 	JG154 Cable 
JG162B Cable (9 Pins) JG162F Cable (13 Pins) JG162Y Cable (5 Pins) 	Tentelometer 		

Ref. No.	Part No.	Parts Name	Remarks
JG002B	APJG002B00	Adapter	VSR Torque, Brake Torque (S Reel/T Reel Ass'y)
JG002E	APJG002E00	Dial Torque Gauge (10~90gf•cm)	Brake Torque (T Reel Ass'y)
JG002F	APJG002F00	Dial Torque Gauge (60~600gf•cm)	VSR Torque, Brake Torque (S Reel)
JG022	APJG022000	Master Plane	Reel Disk Height Adjustment
JG024A	APJG024A00	Reel Disk Height Adjustment Jig	Reel Disk Height Adjustment
JG153	APJG153000	X Value Adjustment Screwdriver	X Value Adjustment
JG154	APJG154000	Cable	Used to connect the test point of SERVICE and GROUND
JG162B	APJG162B00	Cable	Used to connect the Syscon PCB and Main PCB
JG162F	APJG162F00	Cable	Used to connect the Syscon PCB and Main PCB
JG162Y	APJG162Y00	Cable	Used to connect the Syscon PCB and CRT PCB

PREPARATION FOR SERVICING

How to use the Servicing Fixture

1. Unplug the connector CP4201 and CP4202, then remove the TV/VCR Block from the set.
2. Unplug the connector CP810A, CP820A and CP805, then remove the Main PCB from the VCR Block.
3. Connect as shown in the below figure using the Service Fixture.
   • Connect the Syscon PCB to the Main PCB with the cable JG162B and JG162F.
   • Connect the Syscon PCB to the CRT PCB with the cable JG162Y.
4. Remove the Operation PCB from the set, then connect it with the Syscon PCB.
   If necessary, connect CD702 (Front A/V Jack Input Terminal)
5. Short circuit between **TP1001** and **Ground** with the cable JG154.
   (Refer to MAJOR COMPONENTS LOCATION GUIDE)
   The EOT, BOT and Reel Sensor do not work at this moment.
6. At that time, the STOP/EJECT button is available to insert and eject the Cassette Tape.



MECHANICAL ADJUSTMENTS

1. CONFIRMATION AND ADJUSTMENT

Read the following NOTES before starting work.

- Place an object which weighs between 450g~500g on the Cassette Tape to keep it steady when you want to make the tape run without the Cassette Holder. (Do not place an object which weighs over 500g.)
- When you activate the deck without the Cassette Holder, short circuit between **TP1001** and **GND**. **(Refer to ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE)** In this condition the BOT/EOT/Reel Sensor will not function.

1-1: CONFIRMATION AND ADJUSTMENT OF REEL DISK HEIGHT

1. Turn on the power and set to the STOP mode.
2. Set the master plane **(JG022)** and reel disk height adjustment jig **(JG024A)** on the mechanism framework, taking care not to scratch the drum, as shown in **Fig. 1-1-A**.
3. While turning the reel and confirm the following points. Check if the surface "A" of reel disk is lower than the surface "B" of reel disk height adjustment jig **(JG024A)** and is higher than the surface "C". If it is not passed, place the height adjustment washers and adjust to 10(+2, -0)mm.
4. Adjust the other reel in the same way.

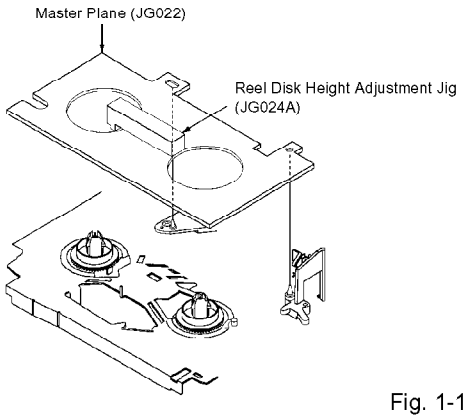


Fig. 1-1-A

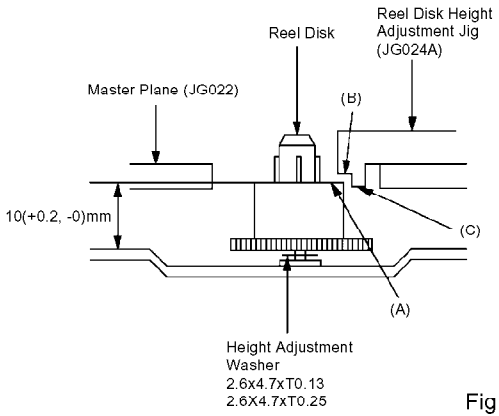


Fig. 1-1-B

1-2: CONFIRMATION AND ADJUSTMENT OF TENSION POST POSITION

1. Set to the PLAY mode.
2. Adjust the Tension Adjust until the edge of the Tension Arm is positioning within 0.5mm range from the standard line center of Main Chassis.
   After this adjustment, confirm that the cut position is located in "A" area as shown in **Fig. 1-2-B**. If it is located in "B" area, adjust again.
3. While turning the S Reel clockwise, confirm that the edge of the Tension Arm is located in the position described above.

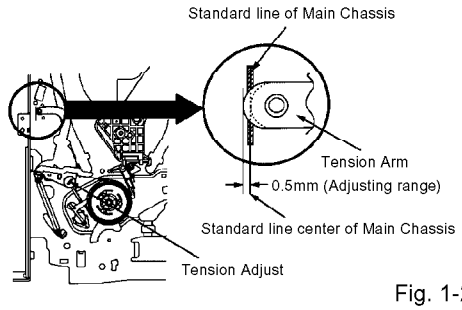


Fig. 1-2-A

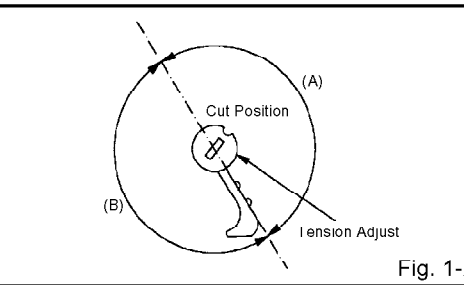


Fig. 1-2-B

1-3: CONFIRMATION OF PLAYBACK TORQUE AND BACK TENSION TORQUE DURING PLAYBACK

1. Load a video tape (T-120) recorded in standard speed mode. Set the unit to the PLAY mode.
2. Install the tentelometer as shown in **Fig. 1-3**. Confirm that the meter indicates 20 ± 2gf in the beginning of playback.

• USING A CASSETTE TYPE TORQUE TAPE **(KT-300NR)**

1. After confirmation and adjustment of Tension Post position **(Refer to item 1-2)**, load the cassette type torque tape **(KT-300NR)** and set to the PLAY mode.
2. Confirm that the right meter of the torque tape indicates 60~110gf•cm during playback in SP mode.
3. Confirm that the left meter of the torque tape indicates 25~40gf•cm during playback in SP mode.

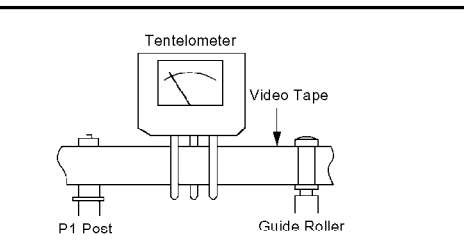


Fig. 1-3

MECHANICAL ADJUSTMENTS

1-4: CONFIRMATION OF VSR TORQUE

1. Install the Torque Gauge **(JG002F)** and Adapter **(JG002B)** on the S Reel. Set to the Picture Search (Rewind) mode. **(Refer to Fig.1-4)**
2. Then, confirm that it indicates 120~180gf•cm.

NOTE

Install the Torque Gauge on the reel disk firmly. Press the REW button to turn the reel disk.

1-5: CONFIRMATION OF REEL BRAKE TORQUE

(S Reel Brake) **(Refer to Fig. 1-4-B)**

1. Once set to the Fast Forward mode then set to the Stop mode. While, unplug the AC cord when the Pinch Roller Block is on the position of **Fig. 1-4-A**.
2. Move the Idler Ass'y from the S Reel.
3. Install the Torque Gauge **(JG002F)** and Adapter **(JG002B)** on the S Reel. Turn the Torque Gauge **(JG002F)** clockwise.
4. Then, confirm that it indicates 60~100gf•cm.

(T Reel Brake) **(Refer to Fig. 1-4-B)**

1. Once set to the Fast Forward mode then set to the Stop mode. While, unplug the AC cord when the Pinch Roller Block is on the position of **Fig. 1-4-A**.
2. Move the Idler Ass'y from the T Reel.
3. Install the Torque Gauge **(JG002E)** and Adapter **(JG002B)** on the T reel. Turn the Torque Gauge **(JG002E)** counterclockwise.
4. Then, confirm that it indicates 45~70gf•cm.

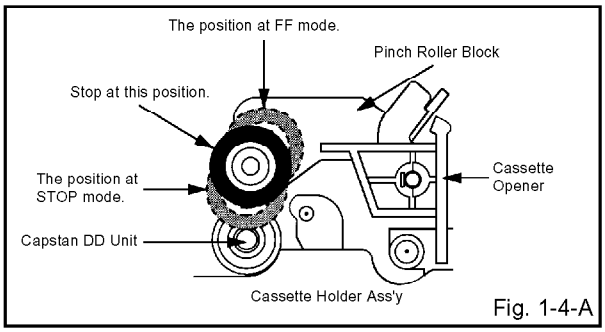


Fig. 1-4-A

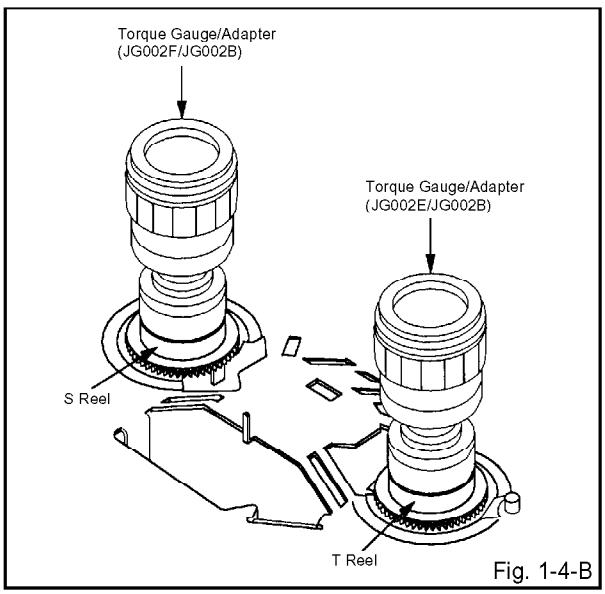


Fig. 1-4-B

NOTE

If the torque is out of the range, replace the following parts.

Check item	Replacement Part
1-4	Idler Ass'y/Clutch Ass'y
1-5	S Reel side: S Reel/Tension Band Ass'y/ Tension Arm Ass'y T Reel side: T Reel/T Brake Spring/T Brake Ass'y

2. CONFIRMATION AND ADJUSTMENT OF TAPE RUNNING MECHANISM

Tape Running Mechanism is adjusted precisely at the factory. Adjustment is not necessary as usual. When you replace the parts of the tape running mechanism because of long term usage or failure, the confirmation and adjustment are necessary.

2-1: GUIDE ROLLER

1. Playback the VHS Alignment Tape.
2. Connect CH-1 of the oscilloscope to **TP4001 (Envelope)** and CH-2 to **TP1002 (SW Pulse)**.
3. Press and hold the Tracking-Auto button on the remote control more than 2 seconds to set tracking to center.
4. Trigger with SW Pulse and observe the envelope. **(Refer to Fig. 2-1-A)**
5. When observing the envelope, adjust the Taper Nut Driver slightly until the envelope will be flat. Even if you press the Tracking Button, adjust so that flatness is not moved so much.
6. Adjust so that the A : B ratio is better than 3 : 2 as shown in **Fig. 2-1-B**, even if you press the Tracking Button to move the envelope (The envelope waveform will begin to decrease when you press the Tracking Button).
7. Adjust the PG shifter during playback. **(Refer to the ELECTRICAL ADJUSTMENTS)**

NOTE

After adjustment, confirm and adjust A/C head. **(Refer to item 2-2)**

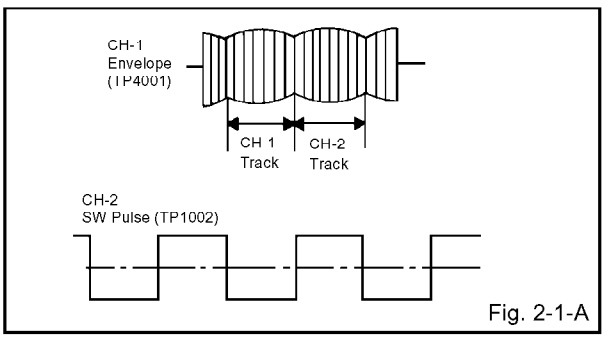


Fig. 2-1-A

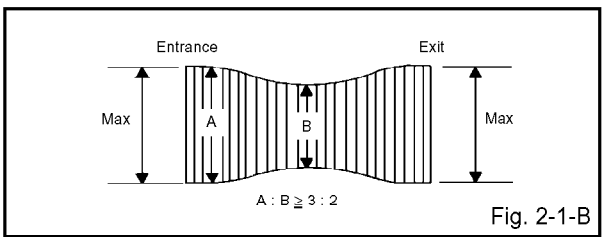


Fig. 2-1-B

MECHANICAL ADJUSTMENTS

2-2: CONFIRMATION AND ADJUSTMENT OF AUDIO/ CONTROL HEAD

When the Tape Running Mechanism does not work well, adjust the following items.

1. Playback the VHS Alignment Tape.
2. Confirm that the reflected picture of stamp mark is appeared on the tape prior to P4 Post as shown in **Fig. 2-2-A**.
   a) When the reflected picture is distorted, turn the screw ① clockwise until the distortion is disappeared.
   b) When the reflected picture is not distorted, turn the screw ① counterclockwise until little distortion is appeared, then adjust the a).
3. Turn the screw ② to set the audio level to maximum.
4. Confirm that the bottom of the Audio/ Control Head and the bottom of the tape is shown in **Fig. 2-2-C**.
   c) When the height is not correct, turn the screw ③ to adjust the height. Then, adjust the 1~3 again.

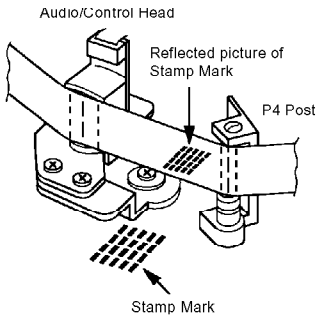


Fig. 2-2-A

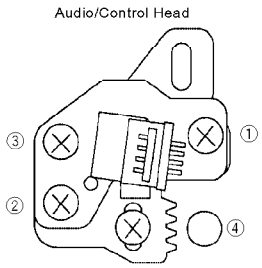


Fig. 2-2-B

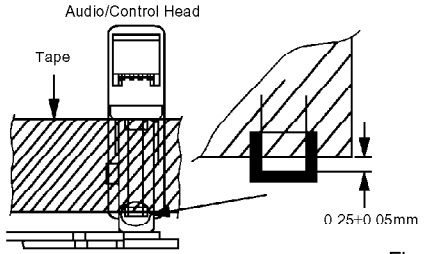


Fig. 2-2-C

2-3: TAPE RUNNING ADJUSTMENT (X VALUE ADJUSTMENT)

1. Confirm and adjust the height of the Reel Disk. **(Refer to item 1-1)**
2. Confirm and adjust the position of the Tension Post. **(Refer to item 1-2)**
3. Adjust the Guide Roller. **(Refer to item 2-1)**
4. Confirm and adjust the Audio/Control Head. **(Refer to item 2-2)**
5. Connect CH-1 of the oscilloscope to **TP4001**, CH-2 to **TP1002** and CH-3 to **HOT side of Audio Out Jack**.
6. Playback the VHS Alignment Tape.
7. Press and hold the Tracking-Auto button on the remote control more than 2 seconds to set tracking to center.
8. Set the X Value adjustment driver **(JG153)** to the ④ of **Fig. 2-2-B**. Adjust X value so that the envelope waveform output becomes maximum. Check if the relation between Audio and Envelope waveform becomes (1) or (2) of **Fig. 2-3**.

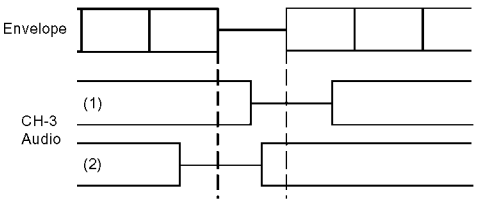
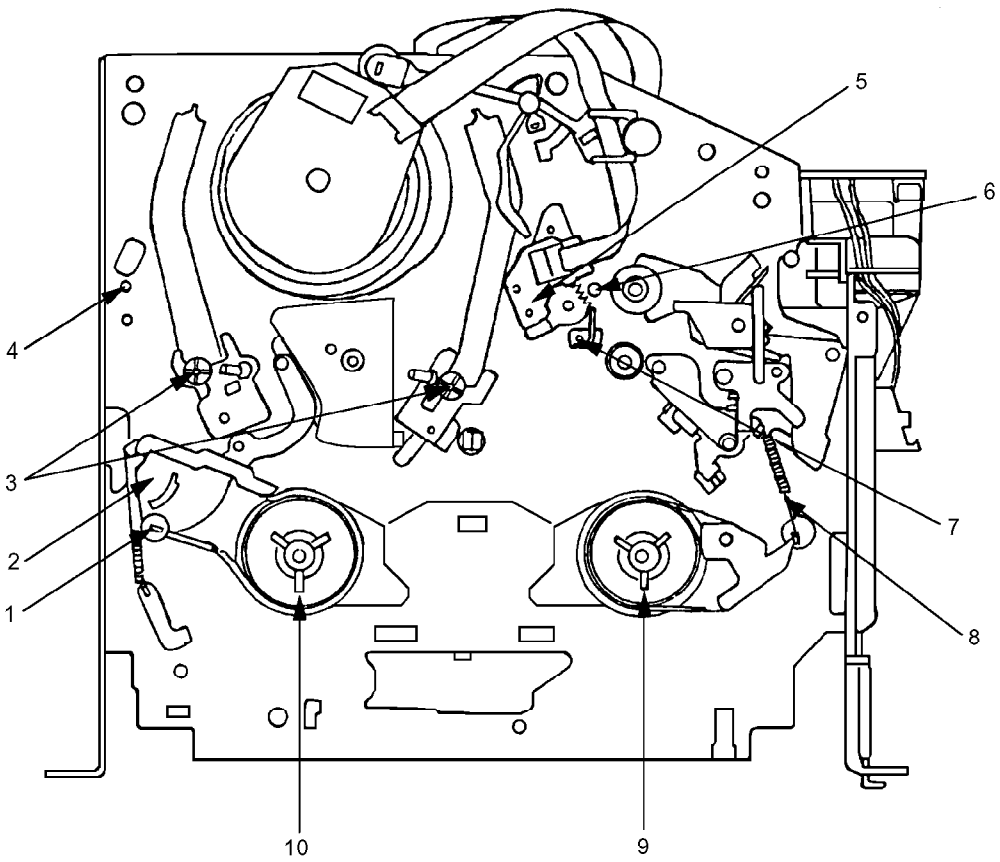


Fig. 2-3

MECHANICAL ADJUSTMENTS

3. MECHANISM ADJUSTMENT PARTS LOCATION GUIDE



1. Tension Adjust
2. Tension Arm
3. Guide Roller
4. P1 Post
5. Audio/Control Head
6. X value adjustment driver hole
7. P4 Post
8. T Brake Spring
9. T Reel
10. S Reel

ELECTRICAL ADJUSTMENTS

1. ADJUSTMENT PROCEDURE

Read and perform these adjustments when repairing the circuits or replacing electrical parts or PCB assemblies.

CAUTION

- Use an isolation transformer when performing any service on this chassis.
- Before removing the anode cap, discharge electricity because it contains high voltage.
- When removing a PCB or related component, after unfastening or changing a wire, be sure to put the wire back in its original position.
  Inferior silicon grease can damage IC's and transistors.
- When replacing IC's and transistors, use only specified silicon grease.
  Remove all old silicon before applying new silicon.

On-Screen Display Adjustment

1. Unplug the AC plug for more than 5 seconds to set the clock to the non-setting state. Then, set the volume level to minimum.
2. Press the VOL. DOWN button on the set and the channel button **(9)** on the remote control simultaneously to display adjustment mode on the screen as shown in **Fig. 1-1**.

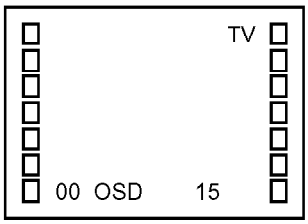


Fig. 1-1

3. Use the Channel UP/DOWN button or Channel button **(0-9)** on the remote control to select the options shown in **Fig. 1-2**.
4. Press the MENU button on the remote control to end the adjustments.

NO.	FUNCTION	NO.	FUNCTION
00	OSD H	13	BRIGHTNESS
01	CUT OFF	14	CONTRAST
02	RF AGC	15	COLOR
03	VIF VCO	16	TINT
04	H VCO	17	SHARPNESS
05	H PHASE	18	FM LEVEL
06	V SIZE	19	LEVEL
07	V SHIFT	20	SEPARATION 1
08	R DRIVE	21	SEPARATION 2
09	B DRIVE	22	TEST MONO
10	R CUT OFF	23	TEST STEREO
11	G CUT OFF	24	X-RAY TEST
12	B CUT OFF		

Fig. 1-2

2. BASIC ADJUSTMENTS (VCR SECTION)

2-1: PG SHIFTER

1. Connect CH-1 on the oscilloscope to **TP1002** and CH-2 to **TP4001**.
2. Playback the alignment tape.
3. Press and hold the Tracking-Auto button on the remote control more than 2 seconds to set tracking to center.
4. Press the VOL. DOWN button on the set and the channel button **(3)** on the remote control simultaneously until the indicator REC disappears. If the indicator REC disappears, adjustment is completed.

(If the above adjustments doesn't work well:)

5. Press the VOL. DOWN button on the set and the channel button **(3)** on the remote control simultaneously until the indicator REC disappears.
6. When the REC indicator is blinking, press both VOL. DOWN button on the set and the channel button **(4)** on the remote control simultaneously and adjust the Tracking +/- button until the arising to the down of Head Switching Pulse becomes 6.5 ± 0.5H.
   (Refer to Fig. 2-1-A, B)
7. Press the Tracking Auto button.

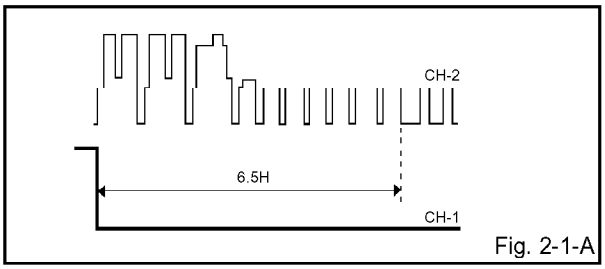


Fig. 2-1-A

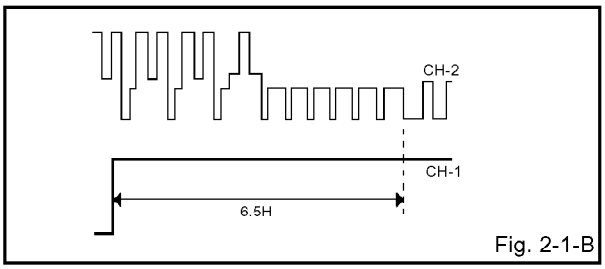


Fig. 2-1-B

2-2: VCO FREERUN

1. Receive the VHF HIGH.
2. Place the set with Aging Test for more than 10 minutes.
3. Connect the digital voltmeter between the **pin 7 of CP602** and the **pin 1 (GND) of CP602**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(03)** on the remote control to select "VIF VCO".
5. Press the VOL. UP/DOWN button on the remote control until the digital voltmeter is 2.5V.

ELECTRICAL ADJUSTMENTS

2-3: RF AGC

1. Receive the VHF HIGH (63dB).
2. Connect the digital voltmeter between the **pin 5 of CP602** and the **pin 1 (GND) of CP602**.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(02)** on the remote control to select "RF AGC".
4. Press the VOL. UP/DOWN button on the remote control until the digital voltmeter is 2.8 ± 0.05V.

2-4: STEREO SEPARATION

1. Receive the stereo signal. (L=2KHz, R=400Hz)
2. Connect the AC voltmeter to **AUDIO OUT L/R** through stereo filter (L=400Hz, R=2KHz).
3. Press the AUDIO SELECT button on the remote control to set to the stereo mode.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(18)** on the remote control to select "FM LEVEL".
5. Press the VOL. UP/DOWN button on the remote control until the difference between with the stereo filter and without the stereo filter is more than 23dB.

(TV SECTION)

2-5: CONSTANT VOLTAGE

1. Connect the digital voltmeter to the **TP401**.
2. Set condition is AV MODE without signal.
3. Adjust the **VR502** until the DC voltage is 111 ± 0.5V.

2-6: OSD HORIZONTAL

1. Activate the adjustment mode display of **Fig. 1-1**.
2. Press the VOL. UP/DOWN button on the remote control until the difference of A and B becomes minimum. **(Refer to Fig. 2-3)**

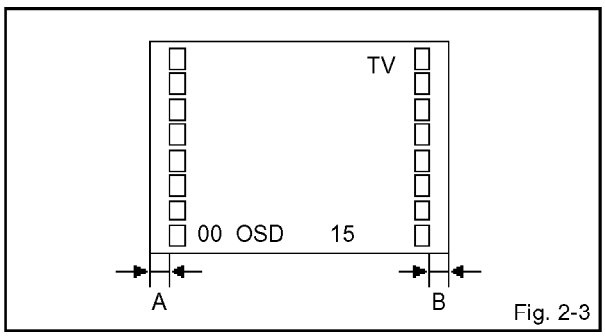


Fig. 2-3

2-7: CUT OFF

1. Adjust the unit to the following settings.
   R CUT OFF=128, G CUT OFF=128, B CUT OFF=128, R DRIVE=64, B DRIVE=64, BRIGHTNESS=100, CONTRAST=85
2. Place the set with Aging Test for more than 15 minutes.
3. Set condition is AV MODE without signal.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(01)** on the remote control to select "CUT OFF".
5. Adjust the **Screen Volume** until a dim raster is obtained.

2-8: WHITE BALANCE

NOTE: Adjust after performing CUT OFF adjustment.

1. Place the set with Aging Test for more than 15 minutes.
2. Receive the color bar pattern.
3. Using the remote control, set the brightness and contrast to normal position.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(10)** on the remote control to select "R CUT OFF".
5. Using the VOL. UP/DOWN button on the remote control, adjust the R CUT OFF.
6. Press the CH. UP/DOWN button on the remote control to select the "R DRIVE", "B DRIVE", "G CUT OFF" or "B CUT OFF".
7. Using the VOL. UP/DOWN button on the remote control, adjust the R DRIVE, B DRIVE, G CUT OFF or B CUT OFF.
8. Perform the above adjustments 6 and 7 until the white color is looked like a white.

2-9: FOCUS

1. Receive the monoscope pattern.
2. Turn the Focus Volume fully counterclockwise once.
3. Adjust the **Focus Volume** until picture is distinct.

2-10: HORIZONTAL PHASE

1. Receive the monoscope pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(05)** on the remote control to select "H PHASE".
4. Press the VOL. UP/DOWN button on the remote control until the SHIFT quantity of the OVER SCAN on right and left becomes minimum.

2-11: HORIZONTAL SIZE

NOTE: Adjust after performing adjustments in section 2-10.

1. Receive the monoscope pattern.
2. Adjust the **VR401** until the SHIFT quantity of the OVER SCAN on right and left becomes 10 ± 2%.

2-12: VERTICAL SIZE

NOTE: Adjust after performing adjustments in section 2-11.

1. Receive the cross hatch signal from the Pattern Generator.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(06)** on the remote control to select "V SIZE".
4. Press the VOL. UP/DOWN button on the remote control until the rectangle on the center of the screen becomes square.
5. Receive a broadcast and check if the picture is normal.

ELECTRICAL ADJUSTMENTS

2-13: VERTICAL SHIFT

NOTE: Adjust after performing adjustments in section 2-12.

1. Receive the center cross signal from the Pattern Generator.
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(07)** on the remote control to select "V SHIFT".
4. Please the VOL. UP/DOWN button on the remote control until the horizontal line becomes fit to the notch of the shadow mask.

2-14: SUB BRIGHTNESS

1. Receive the monoscope pattern. (RF Input)
2. Using the remote control, set the brightness and contrast to normal position.
3. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(13)** on the remote control to select "BRIGHTNESS".
4. Press the VOL. UP/DOWN button on the remote control until the white 10% is starting to be visible.
5. Receive the monoscope pattern. (Audio Video Input)
6. Press the INPUT SELECT button on the remote control to set to the AV mode. Then perform the above adjustments 2~4.

2-15: SUB CONTRAST

1. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(14)** on the remote control to select "CONTRAST".
2. Press the VOL. UP/DOWN button on the remote control until the contrast step No. becomes "85".
3. Receive the color bar pattern. (Audio Video Input)
4. Press the INPUT SELECT button on the remote control to set to the AV mode. Then perform the above adjustments 1, 2.

2-16: SUB TINT

1. Receive the color bar pattern. (RF Input)
2. Using the remote control, set the brightness, contrast, color and tint to normal position.
3. Connect the oscilloscope to **TP806**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(16)** on the remote control to select "TINT".
5. Press the VOL. UP/DOWN button on the remote control until the section "A" becomes a straight line. **(Refer to Fig. 2-4)**
6. Receive the color bar pattern. (Audio Video Input)
7. Press the INPUT SELECT button on the remote control to set to the AV mode. Then perform the above adjustments 2~5.

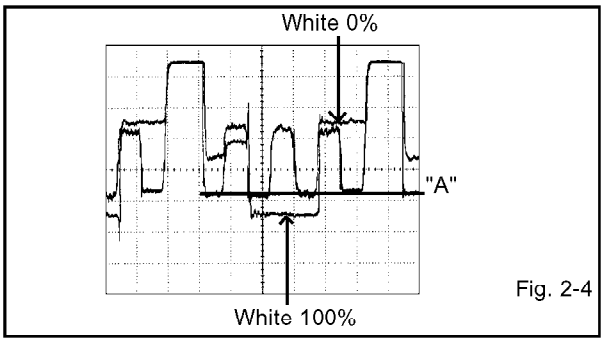


Fig. 2-4

2-17: SUB COLOR

1. Receive the color bar pattern. (RF Input)
2. Using the remote control, set the brightness, contrast, color and tint to normal position.
3. Connect the oscilloscope to **TP804**.
4. Activate the adjustment mode display of **Fig. 1-1** and press the channel button **(15)** on the remote control to select "COLOR".
5. Adjust the VOLTS RANGE VARIABLE knob of the oscilloscope until the range between white 100% and 0% is set to 4 scales on the screen of the oscilloscope.
6. Press the VOL. UP/DOWN button on the remote control until the red color level is adjusted to 110 ± 5% of the white level. **(Refer to Fig. 2-5)**
7. Receive the color bar pattern. (Audio Video Input)
8. Press the INPUT SELECT button on the remote control to set to the AV mode. Then perform the above adjustments 2~6.

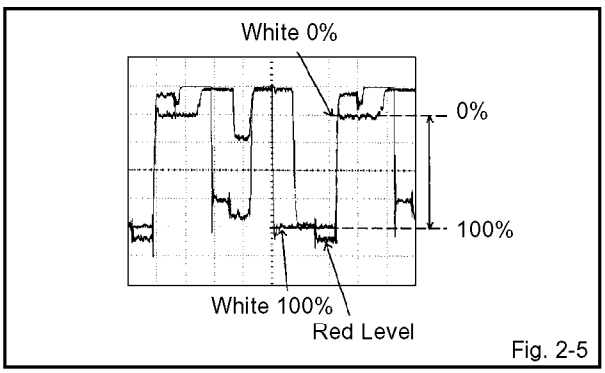


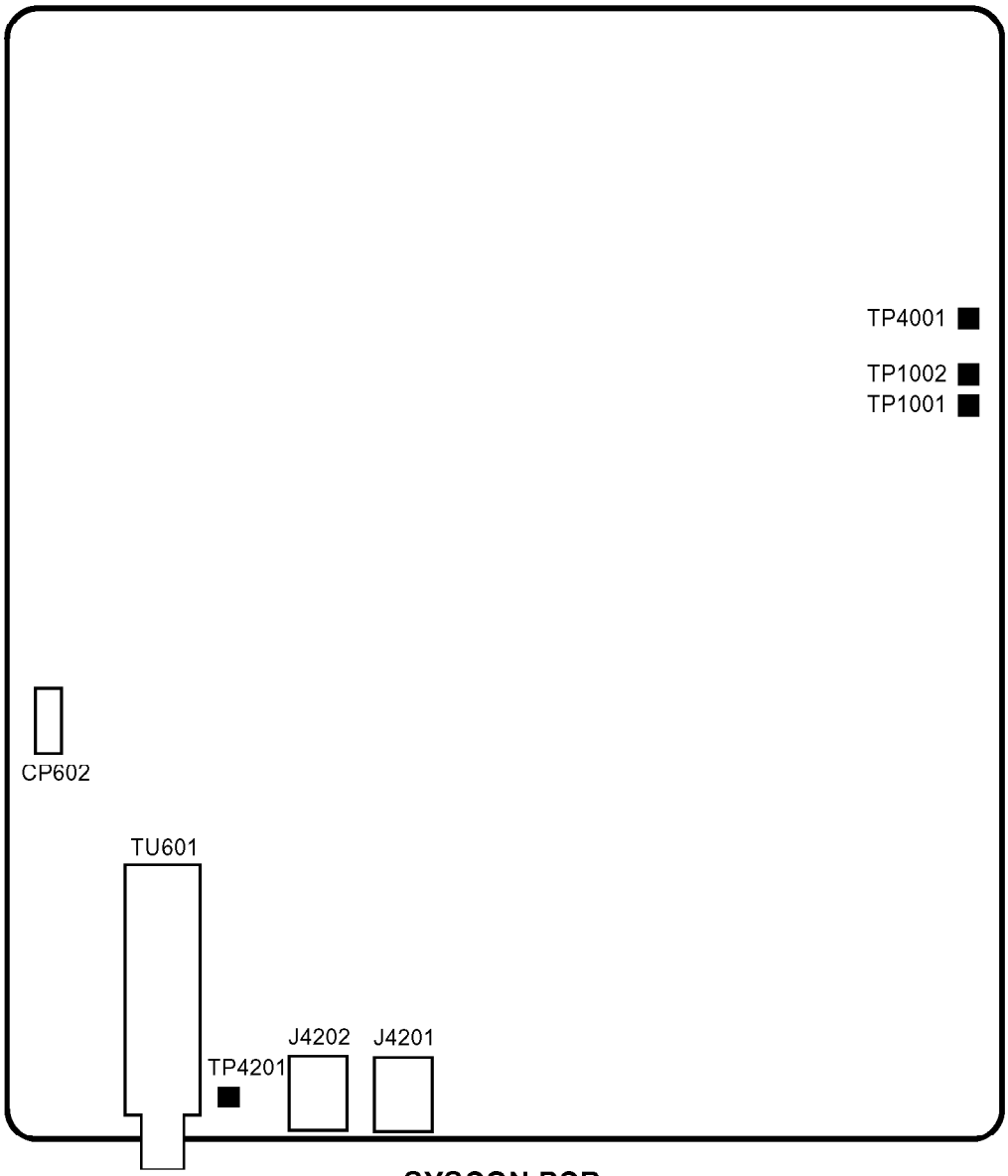
Fig. 2-5

2-18: PIN CUSHION (PCC)

1. Receive the color bar pattern.
2. Using the remote control, set the brightness and contrast to normal position.
3. Adjust the **VR402** until the right and left vertical line becomes straight.

ELECTRICAL ADJUSTMENTS

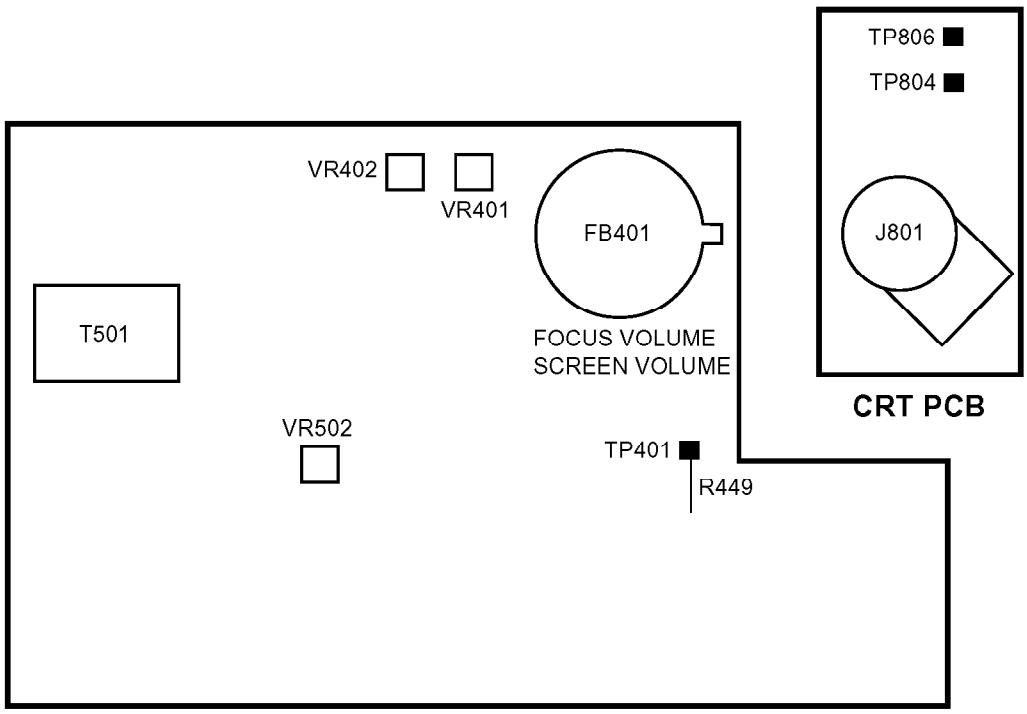
3. ELECTRICAL ADJUSTMENT PARTS LOCATION GUIDE (VCR SECTION)



SYSCON PCB

ELECTRICAL ADJUSTMENTS

(TV SECTION)



ELECTRICAL ADJUSTMENTS

4. PURITY AND CONVERGENCE ADJUSTMENTS

NOTE

1. Turn the unit on and let it warm up for at least 30 minutes before performing the following adjustments.
2. Place the CRT surface facing east or west to reduce the terrestrial magnetism.
3. Turn ON the unit and demagnetize with a Degauss Coil.

4-1: STATIC CONVERGENCE (ROUGH ADJUSTMENT)

1. Tighten the screw for the magnet. Refer to the adjusted CRT for the position. **(Refer to Fig. 4-1)**
   If the deflection yoke and magnet are in one body, untighten the screw for the body.
2. Receive the green raster pattern from the color bar generator.
3. Slide the deflection yoke until it touches the funnel side of the CRT.
4. Adjust center of screen to green, with red and blue on the sides, using the pair of purity magnets.
5. Switch the color bar generator from the green raster pattern to the crosshatch pattern.
6. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
7. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.
8. Adjust the crosshatch pattern to change to white by repeating steps 6 and 7.

4-2: PURITY

NOTE

Adjust after performing adjustments in section 4-1.

1. Receive the green raster pattern from color bar generator.
2. Adjust the pair of purity magnets to center the color on the screen.
   Adjust the pair of purity magnets so the color at the ends are equally wide.
3. Move the deflection yoke backward (to neck side) slowly, and stop it at the position when the whole screen is green.
4. Confirm red and blue colors.
5. Adjust the slant of the deflection yoke while watching the screen, then tighten the fixing screw.

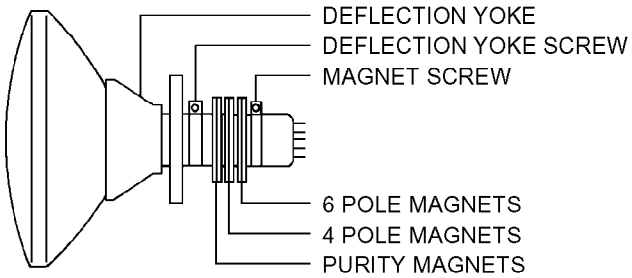


Fig. 4-1

4-3: STATIC CONVERGENCE

NOTE

Adjust after performing adjustments in section 4-2.

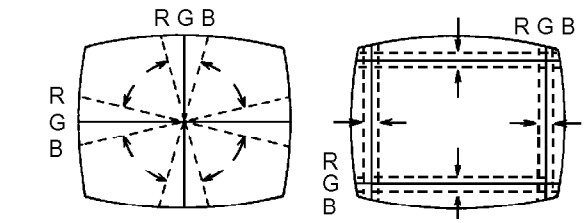
1. Receive the crosshatch pattern from the color bar generator.
2. Combine red and blue of the 3 color crosshatch pattern on the center of the screen by adjusting the pair of 4 pole magnets.
3. Combine red/blue (magenta) and green by adjusting the pair of 6 pole magnets.

4-4: DYNAMIC CONVERGENCE

NOTE

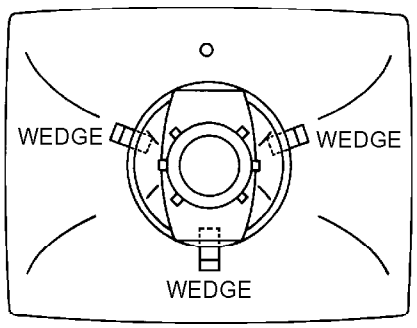
Adjust after performing adjustments in section 4-3.

1. Adjust the differences around the screen by moving the deflection yoke upward/downward and right/left.
   (Refer to Fig. 4-2-a)
2. Insert three wedges between the deflection yoke and CRT funnel to fix the deflection yoke.
   (Refer to Fig. 4-2-b)



UPWARD/DOWNWARD SLANT RIGHT/LEFT SLANT

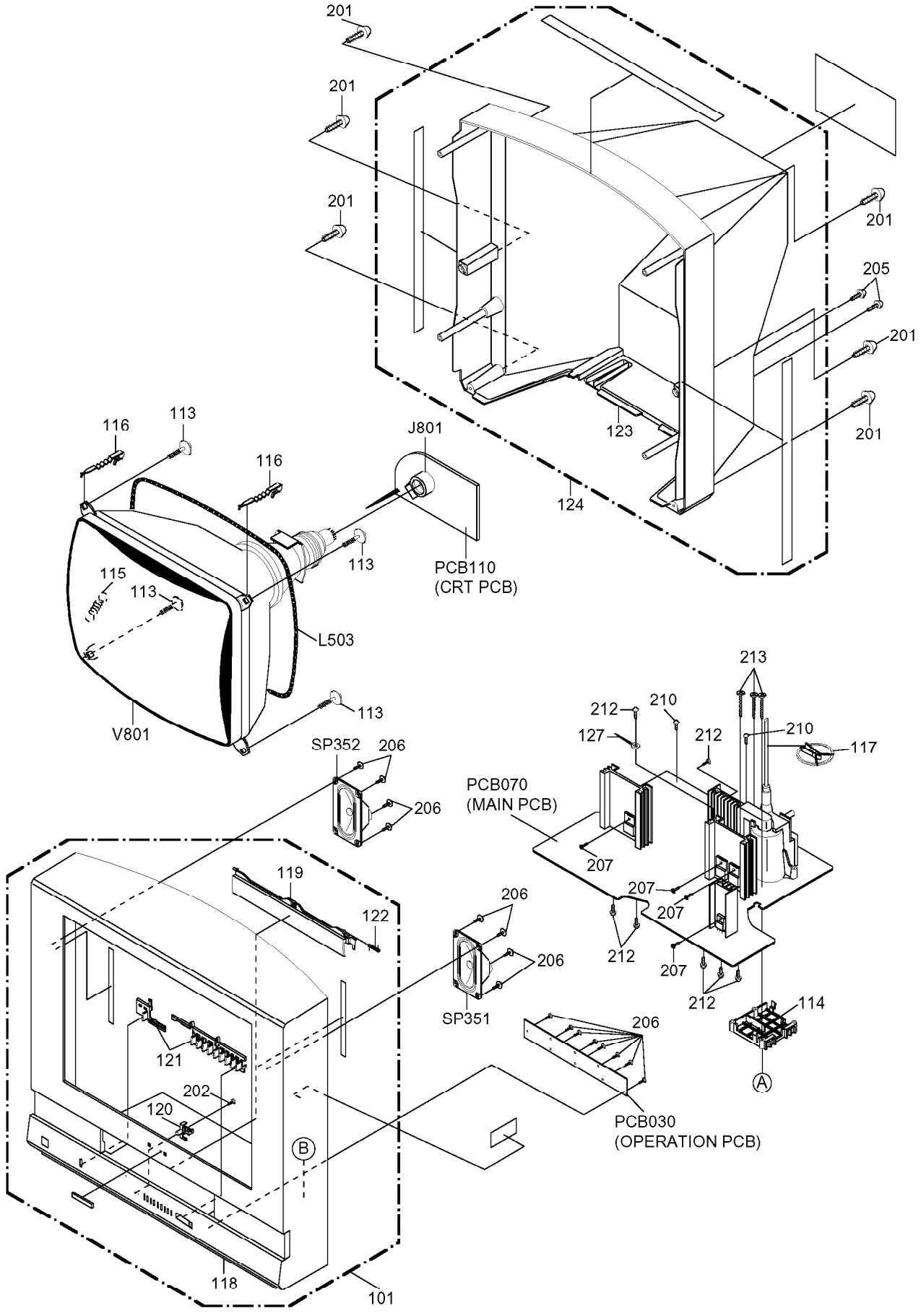
Fig. 4-2-a



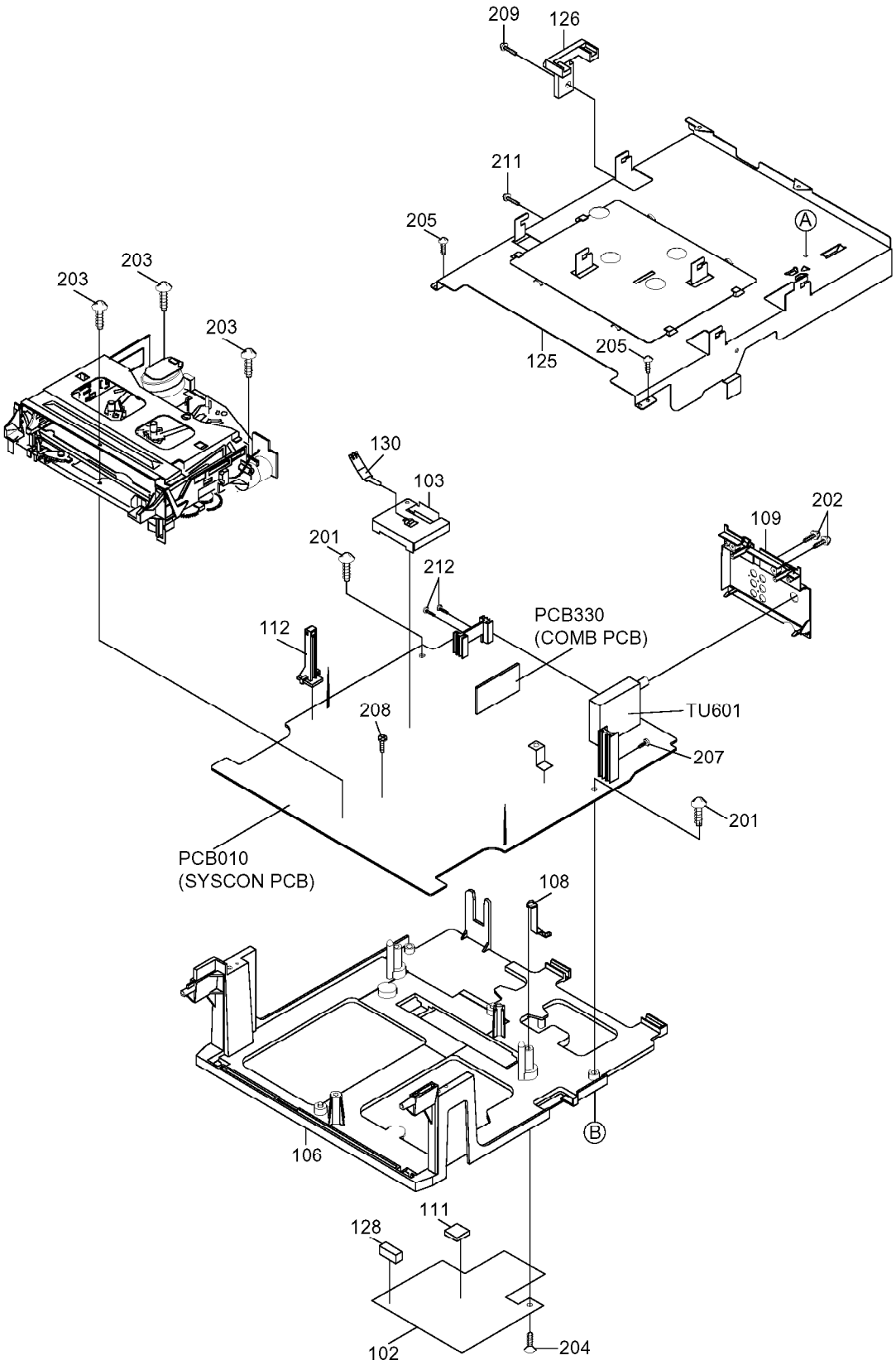
WEDGE POSITION

Fig. 4-2-b

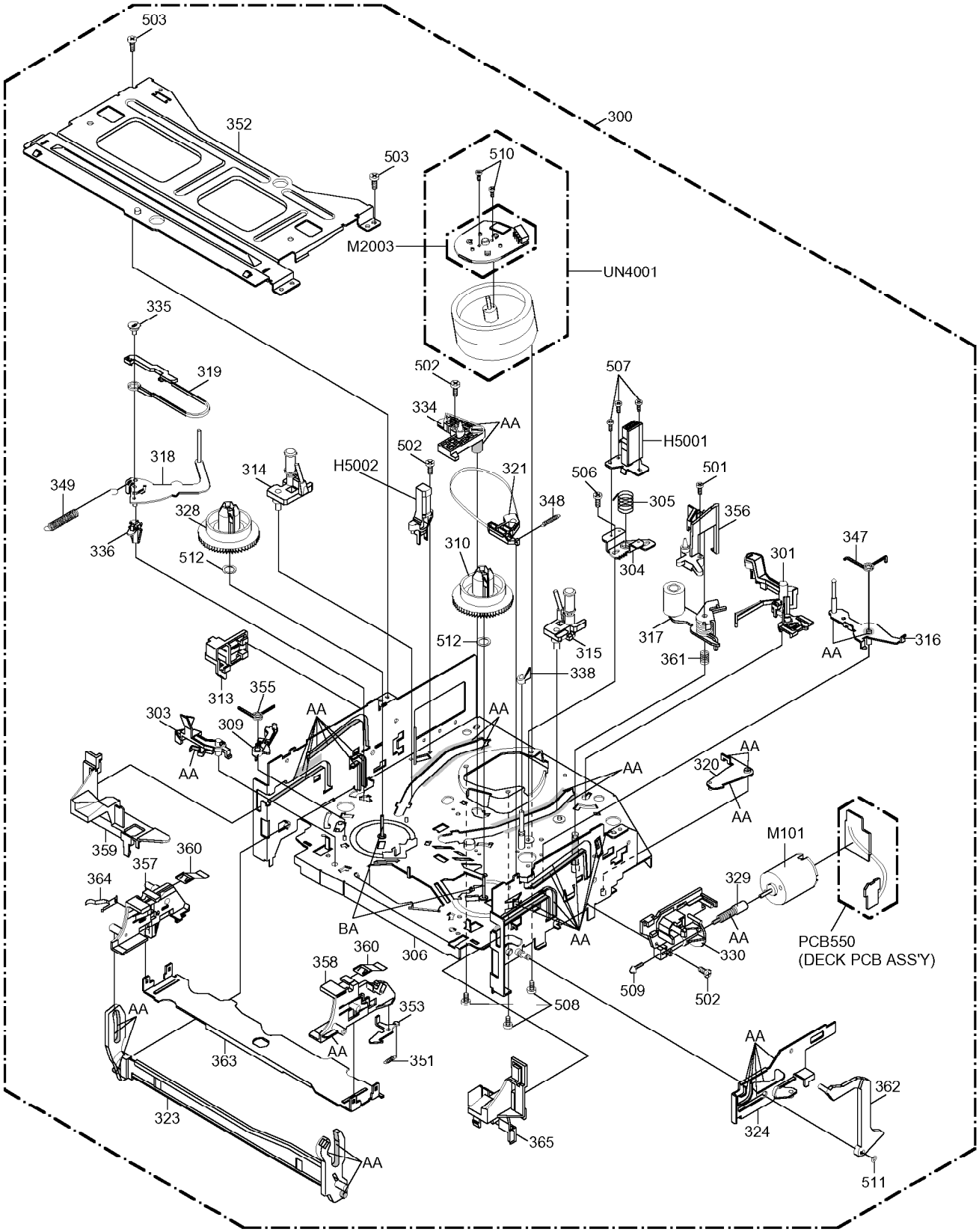
MECHANICAL EXPLODED VIEW



MECHANICAL EXPLODED VIEW



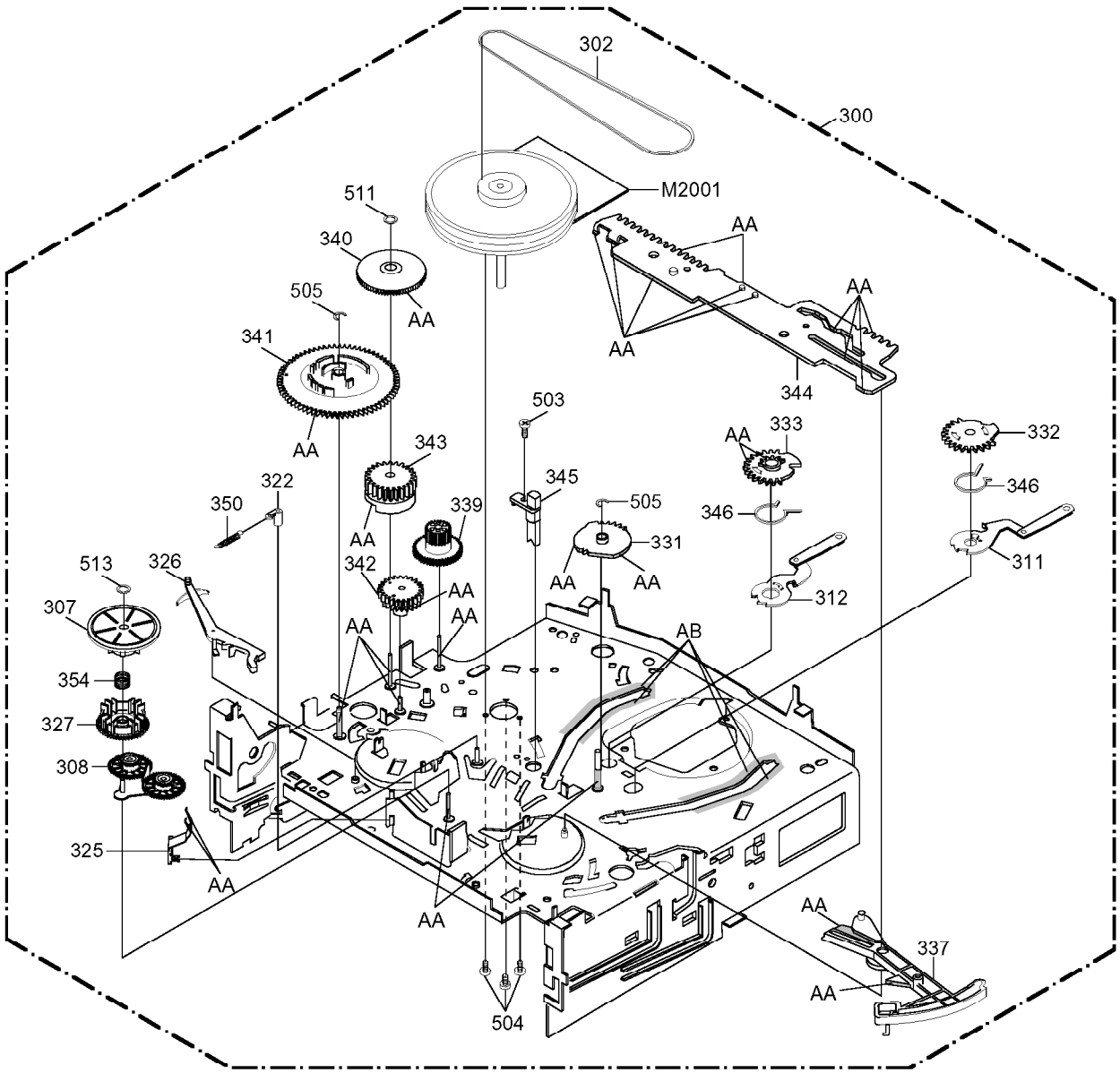
CHASSIS EXPLODED VIEW (TOP VIEW)



CLASS	MARK
GREASE	AA
OIL	BA

NOTE: Applying positions AA and BA for the grease or oil are displayed for this section.
Check if the correct grease or oil is applied for each position.

CHASSIS EXPLODED VIEW (BOTTOM VIEW)



CLASS	MARK
GREASE	AA
OIL	BA

NOTE: Applying positions AA and BA for the grease or oil are displayed for this section.
Check if the correct grease or oil is applied for each position.

MECHANICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
101	BZ610245	A59501Q720	CABINET,FRONT ASSY	
102	BZ710248	752WSAA028	SHIELD,BOTTOM	
103	BZ710328	752WSA0209	SHIELD,CASE HEAD AMP	
106	BZ710249	761WPA0198	HOLDER,DECK	
108	BZ710235	753WSA0120	PLATE,BOTTOM-EARTH	
109	BZ710250	771WPA0256	PLATE,JACK	
111	BZ710252	800WFA0038	CUSHION	10x10xT=2
112	BZ710178	85OP700036	HOLDER,EOT SENSOR	
113	BZ710275	8121J50B54	SCREW,TAPPING(B0) GW20	5x28
114	BZ710459	761WPA0223	HOLDER,FBT	
115	BZ710258	741WUA0001	SPRING,EARTH	
116	BZ710259	762WPA0011	HOLDER,CRT WIRE	
117	BZ710260	899HV3T000	HOLDER,ANODE WIRE	
118	BZ710460	701WPJB287	CABINET,FRONT	
119	BZ710461	712WPJA966	FLAP	
120	BZ710455	713WPA0165	GLASS,LED	
121	BZ710456	735WPBA243	BUTTON,FRAME	
122	BZ710010	743WKA0032	SPRING,FLAP	
123	BZ710457	702WPAA169	CABINET,BACK ASS'Y	
124	BZ610246	A59501Q740	CABINET,BACK ASSY	
125	BZ710381	752WSA0234	PLATE,DECK SHIELD ASS'Y	
126	BZ710012	761WPA0151	HOLDER,M/PCB	
127	BZ710039	8995034000	CORD CLIP UL CO.	
128	BZ710251	800WFA0037	CUSHION	15x5xT=6
130	BZ710331	753WUAA006	SPRING,EARTH HEAD AMP	
201	BZ710036	8117540B04	SCREW,TAPPING(B0) TRUSS	4x20
202	BZ710031	8110630A04	SCREW,TAP TITE(P) BRAZIER	3x10
203	BZ710034	8117140A24	SCREW,TAPPING(B0) PAN	4x12
204	BZ710158	8110630604	SCREW,TAP TITE(P) BRAZIER	3x6
205	BZ710032	8110630A24	SCREW,TAP TITE(P) BRAZIER	3x12
206	BZ710030	8110630804	SCREW,TAP TITE(P) BRAZIER	3x8
207	BZ710239	8109I30A04	SCREW,TAP TITE(B) WH7	3x10
208	BZ710028	8110330804	SCREW,TAP TITE(P) FLAT	3x8
209	BZ710018	8107630804	SCREW,TAP TITE(S) BRAZIER	3x8
210	BZ710337	8107930604	SCREW,CUP(S)	3x6
211	BZ710017	8107226604	SCREW,TAP TITE(S) BIND	2.6x6
212	BZ710019	8109630802	SCREW,TAP TITE(B) BRAZIER	3x8
213	BZ710024	810A130B04	SCREW/WASHER(A)	M3x20
---	BZ710410	792WHA0317	PACKAGE,TOP	
---	BZ710411	792WHA0318	PACKAGE,BOTTOM	
---	BZ710462	793WCDA982	GIFT BOX	
---	BZ614287	J5950101	INSTRUCTION BOOK	

CHASSIS REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
300	BZ610233	A59501A120A	DECK ASSY	A59501A120A
301	BZ710073	85OA500022	AHC ASS'Y	
302	BZ710193	85OP200290	BELT,CAPSTAN (S)	
303	BZ710132	85OP900710	LEVER,REC	
304	BZ710094	85OP500083	BASE,AC HEAD	
305	BZ710112	85OP800324	SPRING,AC HEAD	
306	BZ710354	85OA000449	MAIN CHASSIS ASS'Y (3V)	
307	BZ710195	85OA200082	CLUTCH ASS'Y(S2)	
308	BZ710355	85OA200088	ARM,IDLER ASS'Y 3V	
309	BZ710197	85OP600556	ARM,SS BRAKE (S)	
310	BZ710198	85OP200292	REEL,T (S)	
311	BZ710063	85OA300061	LOADING ARM S ASS'Y	
312	BZ710064	85OA300062	LOADING ARM T ASS'Y	
313	BZ710216	85OP900714	COVER,SENSOR L3	
314	BZ710356	85OA400220	INCLINED BASE S UNIT 3V	
315	BZ710357	85OA400221	INCLINED BASE T UNIT 3V	
316	BZ710200	85OA400199	P5-3 ARM ASS'Y(S)	
317	BZ710072	85OA400205	PINCH ROLLER BLOCK	
318	BZ710065	85OA400175	TENSION ARM ASS'Y	
319	BZ710374	85OA400216	TENSION BAND ASS'Y 3V	
320	BZ710067	85OA400178	PINCH ROLLER LEVER ASS'Y	
321	BZ710375	85OA600197	BRAKE T ASS'Y 3V	
322	BZ710359	85OP500087	HOLDER,SPRING(SV)	
323	BZ710360	85OA900223	LINK UNIT(SV)	
324	BZ710361	85OP900716	LEVER,LINK(SV)	
325	BZ710204	85OP200284	LEVER,CLUTCH (S)	
326	BZ710205	85OP200285	ACTUATOR,CLUTCH	
327	BZ710206	85OP200298	GEAR,COUPLING(S2)	
328	BZ710207	85OP200291	REEL,S (S)	
329	BZ710362	85OP600566	WORM(SV)	
330	BZ710363	85OP600567	BRACKET,MOTOR(SV)	
331	BZ710364	85OP300193	GEAR,MAIN LOADING	
332	BZ710087	85OP300179	GEAR,LOADING S	
333	BZ710088	85OP300180	GEAR,LOADING T	
334	BZ710365	85OP300189	HOLDER,LOADING GEAR (S-ZV)	
335	BZ710090	85OP400472	ADJUST,TENSION	
336	BZ710093	85OP400492	HOLDER,TENSION	
337	BZ710092	85OP400490	LEVER,TENSION	
338	BZ710366	85OP400520	CAP,P4	
339	BZ710097	85OP600543	GEAR,JOINT	
340	BZ710098	85OP600544	GEAR,MIDDLE	
341	BZ710367	85OP600572	CAM,MAIN(S)	
342	BZ710101	85OP600546	CAM,P5	
343	BZ710172	85OP600565	CAM,PINCH ROLLER	
344	BZ710210	85OP600561	ROD,MAIN(S)	
345	BZ710106	85OP700035	REFLECTOR,LED	
346	BZ710107	85OP800318	SPRING,LOADING GEAR	
347	BZ710211	85OP800334	SPRING,P5 (S)	
348	BZ710212	85OP800335	SPRING,BRAKE T (S)	
349	BZ710110	85OP800322	SPRING,TENSION	
350	BZ710213	85OP800336	SPRING,CAP BRAKE (S)	
351	BZ710118	85OP800342	SPRING,LOCKER (S)	
352	BZ710128	85OP900695	BRACKET,TOP	
353	BZ710217	85OP900713	LOCKER,R2	
354	BZ710115	85OP800330	SPRING,RING	
355	BZ710214	85OP800337	SPRING,SS BRAKE (S)	
356	BZ710119	85OP900680	OPENER,CASS	
357	BZ710368	85OP900722	CASS SIDE L(SV)	
358	BZ710369	85OP900723	CASS SIDE R(SV)	
359	BZ710311	85OP900728	TAPE GUIDE L(P,R)	
360	BZ710127	85OP900694	SPRING,PACK	
361	BZ710117	85OP800341	SPRING,P/R ARM	
362	BZ710123	85OP900688	LEVER,FLAP	
363	BZ710370	85OP900717	CASS HOLDER(SV)	
364	BZ710129	85OP900696	SPRING,CASS EARTH	
365	BZ710315	85OP900729	TAPE GUIDE R	

CHASSIS REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
501	BZ710048	8107126A04	SCREW,TAP TITE(S) PAN	2.6x10
502	BZ710049	8107226804	SCREW,TAP TITE(S) BIND	2.6x8
503	BZ710017	8107226604	SCREW,TAP TITE(S) BIND	2.6x6
504	BZ710050	8109126604	SCREW,TAP TITE(B) PAN	2.6x6
505	BZ710058	83ETW30000	E-RING	3.0
506	BZ710371	8107226404	SCREW,TAP TITE(S) BIND	2.6x4
507	BZ710046	8102120604	SCREW,PAN	M2x6
508	BZ710219	810A126504	SCREW/WASHER(A)	M2.6x5
509	BZ710241	810A130504	SCREW/WASHER(A)	M3x5
510	BZ710390	8107226504	SCREW,TAP TITE(S) BIND	2.6x5
511	BZ710055	82P266005N	POLYSLIDER WASHER(CUT)	2.6x6.0xT0.5
512	BZ710218	82Q2647C5N	POLYSLIDER WASHER	2.6x4.7xT0.25
513	BZ710054	82P184505N	POLYSLIDER WASHER(CUT)	1.8x4.5xT0.5
CP101	BZ614040	069R740018	CONNECTOR PCB SIDE	52044-0445
H5001	BZ710040	1523D91034	HEAD (AUDIO CONTROL)	HVMXA1072A
H5002	BZ710041	1543D02013	HEAD (FULL ERASE)	HVFHP0032A
⚠ M101	BZ710044	1596P78001	MOTOR (LOADING)	MXN13FB11H
⚠ M2001	BZ710372	1594S98001	CAPSTAN DD UNIT	F2QSB36
⚠ M2003	BZ710391	1589S11015	MICRO MOTOR	I2OAL01
PCB550	BZ610053	A4C831B550	DECK PCB ASS'Y	VE8851
Q101	BZ410026	0000700320	TRANSISTOR,PHOTO	RPT-38PB113
⚠ UN4001	BZ610201	A4E404B500	CYLINDER UNIT ASS'Y	A4E404B500

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.		Description
		RESISTORS		
⚠R402	BZ210165	R3X18AR56J	R,METAL OXIDE	0.56 OHM 2W
⚠R418	BZ210150	R002T2010J	RC	1 OHM 1/2W
⚠R436	BZ210054	R65582120J	R,FUSE	12 OHM 1/2W
⚠R437	BZ210039	R3X181010J	R,METAL OXIDE	1 OHM 1W
⚠R439	BZ210151	R4X5T4273F	R,METAL	27K OHM 1/4W
⚠R441	BZ210013	R4X5T4104F	R,METAL	100K OHM 1/4W
⚠R443	BZ210198	R4X5T4122F	R,METAL	1.2K OHM 1/4 W
⚠R444	BZ210056	R4X5T4123F	R,METAL	12K OHM 1/4W
⚠R447	BZ210021	R65582680J	R,FUSE	68 OHM 1/2W
⚠R448	BZ210153	R3X181102J	R,METAL OXIDE	1K OHM 1W
⚠R449	BZ210057	R5X2CE272J	R,CEMENT	2.7K OHM 7W
⚠R450	BZ210079	R6558A4R7J	R,FUSE	4.7 OHM 2W
⚠R452	BZ210059	R3X1812R2J	R,METAL OXIDE	2.2 OHM 1W
⚠R500	BZ210001	R21202275K	R,SOLID	2.7M OHM 1/2W
⚠R501	BZ210043	R5Y2CE2R2J	R,CEMENT	2.2 OHM 7W
⚠R512	BZ210061	R3X28A103J	R,METAL OXIDE	10K OHM 2W
R517	BZ210199	R3X18A010J	R,METAL OXIDE	1 OHM 2W
⚠R528	BZ210062	R3X28B223J	R,METAL	22K OHM 3W
⚠R529	BZ210084	R4X5T4272F	R,METAL	2.7K OHM 1/4W
⚠R542	BZ210200	R33681R13J	R,METAL	0.13OHM 1W
⚠R543	BZ210064	R63584681J	R,FUSE	680 OHM 1/4W
R650	BZ210126	R002T4222J	RC	2.2K OHM 1/4W
⚠R804	BZ210050	R3X18A123J	R,METAL OXIDE	12K OHM 2W
⚠R806	BZ210050	R3X18A123J	R,METAL OXIDE	12K OHM 2W
⚠R808	BZ210050	R3X18A123J	R,METAL OXIDE	12K OHM 2W
R4068	BZ210118	R002T4473J	RC	47K OHM 1/4W
		CAPACITORS		
C321	BZ110053	E02LF3102M	CE	1000 UF 25V
⚠C407	BZ110101	E5EZF3222M	CE	2200 UF 25V
⚠C413	BZ110054	P3N1F5333J	CPP	0.033 UF 630V
⚠C421	BZ110055	E5EZF4102M	CE	1000 UF 35V
⚠C423	BZ110056	P447F2474J	CMPP	0.47 UF 200V FHS
C426	BZ110123	C0JLYR713K	CC	0.001 UF 2KV YR
C427	BZ110057	E53FF56R8K	CE	6.8 UF 50V NP
C428	BZ110058	P4N8FJ123H	CMPP	0.012 UF 1.25KV
C430	BZ110123	C0JLYR713K	CC	0.001 UF 2KV YR
⚠C431	BZ110059	E0ELTD100M	CE	10 UF 250V
⚠C433	BZ110020	E5EZT8220M	CE	22 UF 100V
C437	BZ110160	E02LT5101M	CE	100 UF 50V
⚠C443	BZ110060	P4N8FJ222H	CMPP	0.0022UF 1.25KV
C450	BZ110123	C0JLYR713K	CC	0.001 UF 2KV YR
⚠C502	BZ110141	C13VB07H3K	CC	0.0022UF 2KV B
⚠C503	BZ110144	C13VB07H3K	CC	0.0022UF 2KV B
⚠C505	BZ110138	P2472B224M	CMP	0.22UF 275V PHE840
⚠C506	BZ110145	P2472B104M	CMP	0.1 UF 275V PHE840
⚠C507	BZ110012	E51CGC471M	CE	470 UF 200V
⚠C510	BZ110063	E5EZT5470M	CE	47 UF 50V
C514	BZ110113	C0JLYR7K3K	CC	0.0027UF 2KV YR
C517	BZ110095	C0JLYR7E3K	CC	0.0015UF 2KV YR
⚠C520	BZ110028	E5EZT2102M	CE	1000 UF 16V
⚠C521	BZ110130	E62NFC221M	CE	220 UF 200V
⚠C523	BZ110065	E5EZT4471M	CE	470 UF 35V
⚠C524	BZ110032	E5EZF3102M	CE	1000 UF 25V
⚠C529	BZ110066	C034E0J13M	CC	0.001 UF 125V MX
⚠C530	BZ110008	C034E0JH3M	CC	0.0022UF 125V MX
⚠C531	BZ110101	E5EZF3222M	CE	2200 UF 25V
⚠C537	BZ110146	E02LU5R47M	CE	0.47 UF 50V
C664	BZ110147	P235WE105J	CMP	1 UF 63V MKT
C808	BZ110123	C0JLYR713K	CC	0.001 UF 2KV YR
C1021	BZ110163	E5EZT4330M	CE	33 UF 35V
C5558	BZ210163	P1S3T0152J	CP	0.0015UF 50V
		DIODES		
D301	BZ410034	D97U01301B	DIODE,ZENER	MTZJ13B T-77
D302	BZ410034	D97U01301B	DIODE,ZENER	MTZJ13B T-77
D401	DZ410043	D2WT011C10	DIODE,SILICON	11C1-CIC
D403	BZ410019	D97U03001B	DIODE,ZENER	MTZJ30B T-77
D404	BZ410019	D97U03001B	DIODE,ZENER	MTZJ30B T-77
D406	BZ410014	D2LTPG06J0	DIODE,SILICON	RMPG06J-G3
⚠D407	BZ410051	DCBFMV3FU0	DIODE	FMV-3FULF027-102
⚠D408	BZ410018	D94TA27011	DIODE,ZENER	HZ27-1L TD
⚠D409	BZ410017	D94TA11B13	DIODE,ZENER	HZ11B3L TD
D410	BZ410022	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
⚠D411	BZ410014	D2LTPG06J0	DIODE,SILICON	RMPG06J-G3
⚠D412	BZ410014	D2LTPG06J0	DIODE,SILICON	RMPG06J-G3
⚠D413	BZ410014	D2LTPG06J0	DIODE,SILICON	RMPG06J-G3
D414	BZ410014	D2LTPG06J0	DIODE,SILICON	RMPG06J-G3
⚠D415	BZ410014	D2LTPG06J0	DIODE,SILICON	RMPG06J-G3

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
		DIODES		
⚠D501	BZ410044	D4LZBL06L0	DIODE	GBL06L-G177
⚠D503	BZ410080	D2WXRU2AM0	DIODE,SILICON	RU2AM-EIC
⚠D505	BZ410052	D28F21DQN9	DIODE,SCHOTTKY	21DQ09N-FC4
D506	BZ410014	D2LTPG06J0	DIODE,SILICON	RMPG06J-G3
D507	BZ410008	D23U1003A3	DIODE,SCHOTTKY	SB10-03A3
⚠D508	BZ410076	D2WXB290S0	DIODE,SILICON	SB290S
⚠D509	BZ410052	D28F21DQN9	DIODE,SCHOTTKY	21DQ09N-FC4
⚠D510	BZ410080	D2WXRU2AM0	DIODE,SILICON	RU2AM-EIC
⚠D511	BZ410011	D28TELS2N2	DIODE,RECTIFER	10ELS2N-TA1B2
⚠D512	BZ410076	D2WXB290S0	DIODE,SILICON	SB290S
⚠D514	BZ410076	D2WXB290S0	DIODE,SILICON	SB290S
⚠D515	BZ410037	D97U03301B	DIODE,ZENER	MTZJ33B T-77
D517	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D518	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
⚠D519	BZ410076	D2WXB290S0	DIODE,SILICON	SB290S
D521	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D523	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D524	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D525	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D526	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D528	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
D529	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D530	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
⚠D533	BZ410011	D28TELS2N2	DIODE,RECTIFER	10ELS2N-TA1B2
D601	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D602	BZ410053	D97U08R21C	DIODE,ZENER	MTZJ8.2C T-77
D605	BZ410059	D2WT11ES10	DIODE,SILICON	11ES1-EIC
D607	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D608	BZ410022	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D609	BZ410022	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D610	BZ410008	D23U1003A3	DIODE,SCHOTTKY	SB10-03A3
D612	BZ410022	D97U06R81B	DIODE,ZENER	MTZJ6.8B T-77
D616	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D617	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D618	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D791	BZ410054	0021721150	LED	SLR-342VCT32
D792	BZ410054	0021721150	LED	SLR-342VCT32
D793	BZ410054	0021721150	LED	SLR-342VCT32
D801	BZ410006	D1VT001330	DIODE,SILICON	1SS133T 77
D802	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D803	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D1003	BZ410001	0010600060	LED	SID1050CM
D1014	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
D4201	BZ410021	D97U05R61B	DIODE,ZENER	MTZJ5.6B T-77
D4204	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D4205	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
D4206	BZ410034	D97U01301B	DIODE,ZENER	MTZJ13B T-77
D5501	BZ410006	D1VT001330	DIODE,SILICON	1SS133T-77
		ICS		
IC301	BZ611034	I06DF62420	IC	M62420SP
IC352	BZ611035	I0FSP75220	IC	AN7522
⚠IC401	BZ611053	I01TD55220	IC	AN5522
IC501	BZ611015	I1KA97805A	IC	KIA7805API
⚠IC502	BZ611036	I2BT06624G	IC	STR-G6624
⚠IC506	BZ410055	0002500450	PHOTO COUPLER	TLP621(GR)
IC601	BZ611055	I06FC61206	IC	M61206FP
⚠IC603	BZ611033	I1KA97809A	IC	KIA7809API
IC901	BZ611079	I05FE90A45	IC	TC90A45F
IC1001	BZ611056	I56F57059A	IC	OEC7059A
IC1002	BZ611057	IC7J0311A0	IC	R3111N311A/C-TR
IC1004	BZ611058	I03DQ18800	IC	LB11880
IC1099	BZ610232	A59501B015	IC	S-24C04BDP-LA
IC4001	BZ611059	I03F3201M0	IC	LA71201M-MPB
IC5501	BZ611024	I01F62FBP0	IC	AN3662FBP
		TRANSISTORS		
Q350	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
⚠Q401	BZ510004	TA3T016240	TRANSISTOR,SILICON	2SA1624-AA
Q402	BZ510029	TNYTD03001	COMPOUND TRANSISTOR	DTC144ESTP
Q403	BZ510078	TNATJ03003	COMPOUND TRANSISTOR	KRC111MAT
Q404	BZ510073	TAATA12660	TRANSISTOR,SILICON	KTA1266-AT(Y,GR)
⚠Q405	BZ510027	TC3Q026210	TRANSISTOR,SILICON	2SC2621(D,E)-RAC
⚠Q406	BZ510040	TDUU024990	TRANSISTOR,SILICON	2SD2499(LB0EC1)
Q407	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
Q408	BZ510073	TAATA12660	TRANSISTOR,SILICON	KTA1266-AT(Y,GR)
Q409	BZ510041	TD30016670	TRANSISTOR,SILICON	2SD1667(R,S)
Q410	BZ510029	TNYTD03001	COMPOUND TRANSISTOR	DTC144ESTP
Q501	BZ510074	TDAT00863Y	TRANSISTOR,SILICON	KTD863_Y-AT

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
		TRANSISTORS		
Q502	BZ510005	TA3T1371A0	TRANSISTOR,SILICON	2SA1371(D,E)-AE
Q503	BZ510005	TA3T1371A0	TRANSISTOR,SILICON	2SA1371(D,E)-AE
Q505	BZ510011	TC3T029090	TRANSISTOR,SILICON	2SC2909(S,T)-AA
Q507	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
⚠Q508	BZ510057	TAAT01281Y	TRANSISTOR,SILICON	KTA1281_Y
Q509	BZ510024	TNYTJ03001	COMPOUND TRANSISTOR	DTC114TSTP
Q512	BZ510011	TC3T029090	TRANSISTOR,SILICON	2SC2909(S,T)-AA
Q513	BZ510023	TNYTB03001	COMPOUND TRANSISTOR	DTC114ESTP
Q601	BZ510001	T6YJ1037K0	TRANSISTOR,SILICON	2SA1037AKT146R,S
⚠Q602	BZ510043	TC10013840	TRANSISTOR,SILICON	2SC13840W
⚠Q603	BZ510043	TC10013840	TRANSISTOR,SILICON	2SC13840W
Q605	BZ510057	TAAT01281Y	TRANSISTOR,SILICON	KTA1281_Y
⚠Q606	BZ510044	TC5T021204	TRANSISTOR,SILICON	2SC2120Y(TPE2)
Q609	BZ510045	TNYJD05001	COMPOUND TRANSISTOR	DTC144EKAT146
⚠Q610	BZ510031	TD3T007340	TRANSISTOR,SILICON	2SD734(E,F)-AA
⚠Q611	BZ510031	TD3T007340	TRANSISTOR,SILICON	2SD734(E,F)-AA
⚠Q801	BZ510027	TC3Q026210	TRANSISTOR,SILICON	2SC2621(D,E)-RAC
⚠Q802	BZ510027	TC3Q026210	TRANSISTOR,SILICON	2SC2621(D,E)-RAC
⚠Q803	BZ510027	TC3Q026210	TRANSISTOR,SILICON	2SC2621(D,E)-RAC
⚠Q810	BZ510046	TC7T1740S0	TRANSISTOR,SILICON	2SC1740SP(R,S) TP
⚠Q811	BZ510046	TC7T1740S0	TRANSISTOR,SILICON	2SC1740SP(R,S) TP
⚠Q812	BZ510046	TC7T1740S0	TRANSISTOR,SILICON	2SC1740SP(R,S) TP
Q901	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q902	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q903	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q1002	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q1003	BZ410041	0002700530	PHOTO COUPLER	RPI-352Q01R
Q1004	BZ510067	TNAAC05002	COMPOUND TRANSISTOR	KRC103RTK
Q1005	BZ410049	0002700590	PHOTO COUPLER	RPI-301
Q1009	BZ410041	0002700530	PHOTO COUPLER	RPI-352Q01R
Q1013	BZ410042	0000100380	PHOTO TRANSISTOR	PNA2604M010R
Q1023	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q4001	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
Q4002	BZ510069	TCATC31980	TRANSISTOR,SILICON	KTC3198-AT(Y,GR)
Q4003	BZ510026	TPYJC05001	COMPOUND TRANSISTOR	DTA124EKAT146
Q4005	BZ510073	TAATA12660	TRANSISTOR,SILICON	KTA1266-AT(Y,GR)
Q4006	BZ510070	TCAT032034	TRANSISTOR,SILICON	KTC3203_Y-AT
Q4007	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q4009	BZ510001	T6YJ1037K0	TRANSISTOR,SILICON	2SA1037AKT146R,S
Q4010	BZ510001	T6YJ1037K0	TRANSISTOR,SILICON	2SA1037AKT146R,S
Q4012	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q4013	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q4203	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q4204	BZ510071	TNAAB05003	COMPOUND TRANSISTOR	KRC102RTK
Q4205	BZ510071	TNAAB05003	COMPOUND TRANSISTOR	KRC102RTK
Q4206	BZ510071	TNAAB05003	COMPOUND TRANSISTOR	KRC102RTK
Q4210	BZ510001	T6YJ1037K0	TRANSISTOR,SILICON	2SA1037AKT146R,S
Q4211	BZ510002	T8YJ2412K0	TRANSISTOR,SILICON	2SC2412KT146 R,S
Q4212	BZ510001	T6YJ1037K0	TRANSISTOR,SILICON	2SA1037AKT146R,S
		COILS &TRANSFORMERS		
L301	BZ310005	02167D101K	COIL	100 UH
L302	BZ310005	02167D101K	COIL	100 UH
L401	BZ310004	021679472K	COIL	4.7 MH
⚠L402	BZ310063	022100027A	COIL,LINEARITY	ELH5L4113
L481	BZ310064	02D8000012	TIB PIN PHASE COIL	D8000012
⚠L501	BZ310115	029T000093	COIL,LINE FILTER	1R5A472F24
⚠L503	BZ310066	028R200024	COIL,DEGAUSS	8R200024
L603	BZ310101	0216A61R2K	COIL	1.2 UH
L604	BZ310002	021673101K	COIL	100 UH
L605	BZ310112	021LA61R2K	COIL	1.2 UH
L607	BZ310058	021LA6220K	COIL	22 UH
L608	BZ310002	021673101K	COIL	100 UH
L610	BZ310005	02167D101K	COIL	100 UH
L613	BZ310136	021LA63R3K	COIL	3.3 UH
L618	BZ310117	021LA6330K	COIL	33 UH
L621	BZ310118	02AHB9A972	CORE,FERRITE	W5T29X7.5X19
L802	BZ310070	02167D820K	COIL	82 UH
L804	BZ310070	02167D820K	COIL	82 UH
L901	BZ310138	021673821K	COIL	820 UH
L902	BZ310139	02167F151J	COIL	150 UH
L903	BZ310140	02167F150J	COIL	15 UH
L904	BZ310141	02167F100J	COIL	10 UH
L1001	BZ310009	021LA62R2K	COIL	2.2 UH
L4001	BZ310039	02167F220J	COIL	22 UH
L4003	BZ310002	021673101K	COIL	100 UH
L4004	BZ310039	02167F220J	COIL	22 UH
L4005	BZ310040	02167F470J	COIL	47 UH

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description	
		COILS &TRANSFORMERS		
L4006	BZ310040	02167F470J	COIL	47 UH
L4007	BZ310024	0326230038	COIL,TRAP	2623003
L4008	BZ310002	021673101K	COIL	100 UH
L4009	BZ310039	02167F220J	COIL	22 UH
L4205	BZ310002	021673101K	COIL	100 UH
L5501	BZ310002	021673101K	COIL	100 UH
L5503	BZ310071	021LA6820K	COIL	82 UH
L5504	BZ310039	02167F220J	COIL	22 UH
L5505	BZ310039	02167F220J	COIL	22 UH
L5506	BZ310041	02167F101J	COIL	100 UH
T401	BZ310072	045013001J	TRANS,HORIZONTAL DRIVE	5013001
⚠T501	BZ310073	0481350524	TRANSFORMER,SWITCHING	81350524
T4001	BZ310114	031626009R	COIL,BIAS OSC	1626009
		JACKS		
⚠J351	BZ614002	060G131014	RCA JACK	HTJ-035-28A
J701	BZ614114	0602431013	RCA JACK	JPJ1187-010010
⚠J801	BZ614115	066C130017	SOCKET,CATHODE RAY TUBE	CVT3275-5101
J4201	BZ614203	060Q431018	RCA JACK	AV3-19DS-1
J4202	BZ614204	060Q411015	RCA JACK	AV3-19D-1
		SWITCHES		
SW751	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW791	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW792	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW793	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW794	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW795	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW796	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW797	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW798	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW799	BZ612010	0504101T34	SWITCH,TACT	EVQ21505R
SW1001	BZ612002	0508221001	SWITCH (LEAF)	SPVF130100
		VARIABLE RESISTORS		
VR401	BZ210101	V1163H4BTC	VOLUME,SEMI FIXED	EVNCYAA03BE4
VR402	BZ210101	V1163H4BTC	VOLUME,SEMI FIXED	EVNCYAA03BE4
VR404	BZ210068	V1163Q3BTC	VOLUME,SEMI FIXED	EVNCYAA03BQ3
VR502	BZ210109	V1163Q2BTC	VOLUME,SEMI FIXED	EVNCYAA03BQ2
		P.C.BOARD ASSEMBLIES		
PCB010	BZ610247	A59501Q01A	PCB ASS'Y	VMA214A
PCB030	BZ610228	A59504B03A	PCB ASS'Y	TEXA33C
PCB070	BZ610229	A59504B07A	PCB ASS'Y	TMA506A
PCB110	BZ610230	A59504B11A	PCB ASS'Y	TCA362A
PCB330	BZ610231	A59504B33A	PCB ASS'Y	VEA943A
PCB550	BZ610053	A4C831B550	SEE CHASSIS REPLACEMENT PARTS LIST	
		MISCELLANEOUS		
B301	BZ310121	024HT03553	CORE,BEADS	W5RH3.5X5X1.0
B502	BZ310122	024HT03563	CORE,BEADS	W4BRH3.5X6X1.0X2
B504	BZ310121	024HT03553	CORE,BEADS	W5RH3.5X5X1.0
B505	BZ310122	024HT03563	CORE,BEADS	W4BRH3.5X6X1.0X2
BL001	BZ310014	023C00022A	COIL,BALUN	HPN-01
CD355	BZ614205	06CU123201	CORD,CONNECTOR	CU123201
CD356	BZ614205	06CU123201	CORD,CONNECTOR	CU123201
⚠CD501	BZ614197	1207414905	CORD,AC BUSH	7414905
CD601	BZ614059	06CH01006A	CORD,CONNECTOR	CH01006A
CD702	BZ614206	06CU2B2801	CORD,CONNECTOR	CU2B2801
CD757	BZ614207	06CU2A2501	CORD,CONNECTOR	CU2A2501
CD802	BZ614122	06CP82035A	CORD,CONNECTOR	CP82035A
CD803	BZ614233	122Y054501	CORD,JUMPER	2Y054501
CD805	BZ614267	122Y054403	CORD,JUMPER	2Y054403
CD810	BZ614210	122Y094001	CORD,JUMPER	2Y094001
CD820	BZ614211	122Y0D2501	CORD,CONNECTOR	2Y0D2501
CF601	BZ613014	1022T45R72	FILTER,SAW	SAF45MFY220ZR
CF603	BZ613015	1011T4R504	FILTER,CERAMIC	EFCT4R5YS5A
CF604	BZ613016	1011T4R517	FILTER,CERAMIC	EFCT4R5MW5
⚠CP401	DZ614020	069X450029	CONNECTOR PCB SIDE	D05D-DVS
CP402	BZ614016	069W01001A	CONNECTOR PCB SIDE	003P-2100
⚠CP502	BZ614283	069S420110	CONNECTOR PCB SIDE	A1561WV2-2P
CP602	BZ614039	069E270129	CONNECTOR PCB SIDE	8283_0712_00_000
CP604	BZ614284	069J160048	CONNECTOR PCB SIDE	IMSA-9130S-06L
CP801	BZ614058	069W010010	CONNECTOR PCB SIDE	005P-2100
CP802	BZ614269	069S320010	CONNECTOR PCB SIDE	A2361WV2-2P
CP805	BZ614212	069R250589	CONNECTOR PCB SIDE	52147-0510
CY901	BZ614285	069J160038	CONNECTOR PCB SIDE	IMSA-9130B-06
CD1002	BZ614198	122F071901	CORD,JUMPER	2F071901
CD4203	BZ614124	06CH01812A	CORD,EIS CONNECTOR	CH01812A
CD4206	BZ614060	06CH01388A	CORD,EIS CONNECTOR	CH01388A
CP1004	BZ614010	0697280590	CONNECTOR PCB SIDE	TMC-J08P-B1

ELECTRICAL REPLACEMENT PARTS LIST

Location No.	TSB P/N	Reference No.	Description		
			MISCELLANEOUS		
CP1005	BZ614086	069J770029	CONNECTOR PCB SIDE	IMSA-9604S-07Z14	
CP1006	BZ614014	069J740029	CONNECTOR PCB SIDE	IMSA-9604S-04Z14	
CP4001	BZ614011	0697290620	CONNECTOR PCB SIDE	TOC-C09X-A1	
CP4002	BZ614050	069J760029	CONNECTOR PCB SIDE	IMSA-9604S-06Z14	
CP4003	BZ614009	0697120320	CONNECTOR PCB SIDE	TMC-T02X-E1	
CP4201	BZ614213	069S2A0629	CONNECTOR PCB SIDE	A2001WV2-10P	
CP4202	BZ614214	069S2B0629	CONNECTOR PCB SIDE	A2001WV2-11P	
CP803A	BZ614006	067R105019	WIRE HOLDER	51052-0500	
CP803B	BZ614006	067R105019	WIRE HOLDER	51052-0500	
CP805B	BZ614215	067R005019	WIRE HOLDER	51048-0510	
CP810A	BZ614216	069R290589	CONNECTOR PCB SIDE	52147-0910	
CP810B	BZ614217	067R009019	WIRE HOLDER	51048-0910	
CP820A	BZ614218	069R2D0589	CONNECTOR PCB SIDE	52147-1310	
CP820B	BZ614219	067R013019	WIRE HOLDER	51048-1310	
CUS012	BZ710148	800WFAA007	CUSHION B		
CUS013	BZ710149	800WFAA008	CUSHION C		or
	BZ710002	800WF00019	CUSHION-C		
EL001	BZ614043	124116281A	EYE LET	XRY16X28BD	
EL002	BZ614044	124120301A	EYE LET	XRY20X30BD	
⚠F501	BZ614125	081PC6R304	FUSE	51MS063LCC	
⚠F502	BZ614126	081PC2R504	FUSE	51MS025LCC	
⚠FB401	BZ310131	043221017R	TRANSFORMER,FLYBACK	3221017R	
FH501	BZ614005	06710T0006	HOLDER,FUSE	EYF-52BC	
FH502	BZ614005	06710T0006	HOLDER,FUSE	EYF-52BC	
FH503	BZ614005	06710T0006	HOLDER,FUSE	EYF-52BC	
FH504	BZ614005	06710T0006	HOLDER,FUSE	EYF-52BC	
OS753	BZ614127	077Q000019	REMOTE RECEIVER	PIC-28143TC5	
PH001	BZ614016	069W01001A	CONNECTOR PCB SIDE	003P-2100	
PH002	BZ614016	069W01001A	CONNECTOR PCB SIDE	003P-2100	
⚠SP351	BZ614253	070W546003	SPEAKER	MSF-18D5SB05-02	
⚠SP352	BZ614253	070W546003	SPEAKER	MSF-18D5SB05-02	
⚠TH501	BZ410079	DF5EL3R0A0	DEGAUSS ELEMENT	ZPB45BL3R0A	
TM101	BZ614221	076N0DQ040	TRANSMITTER	VC-FL20S	
⚠TU601	BZ610125	0145K00055	TUNER,VHF-UHF	TECC1040PG32D	
⚠V801	BZ614130	098W210419	CRT W/DY	A51LSH196X01(O)	
X602	BZ613004	100CT3R505	CRYSTAL	HC-49/C	
X1001	BZ613002	100CT01207	CRYSTAL	HC-49/U-S	
X1002	BZ613006	100DA32R01	CRYSTAL	DT-26	
X4001	BZ613017	100CT3R502	CRYSTAL	HC-49/U	

RESISTOR

RC..... CARBON RESISTOR

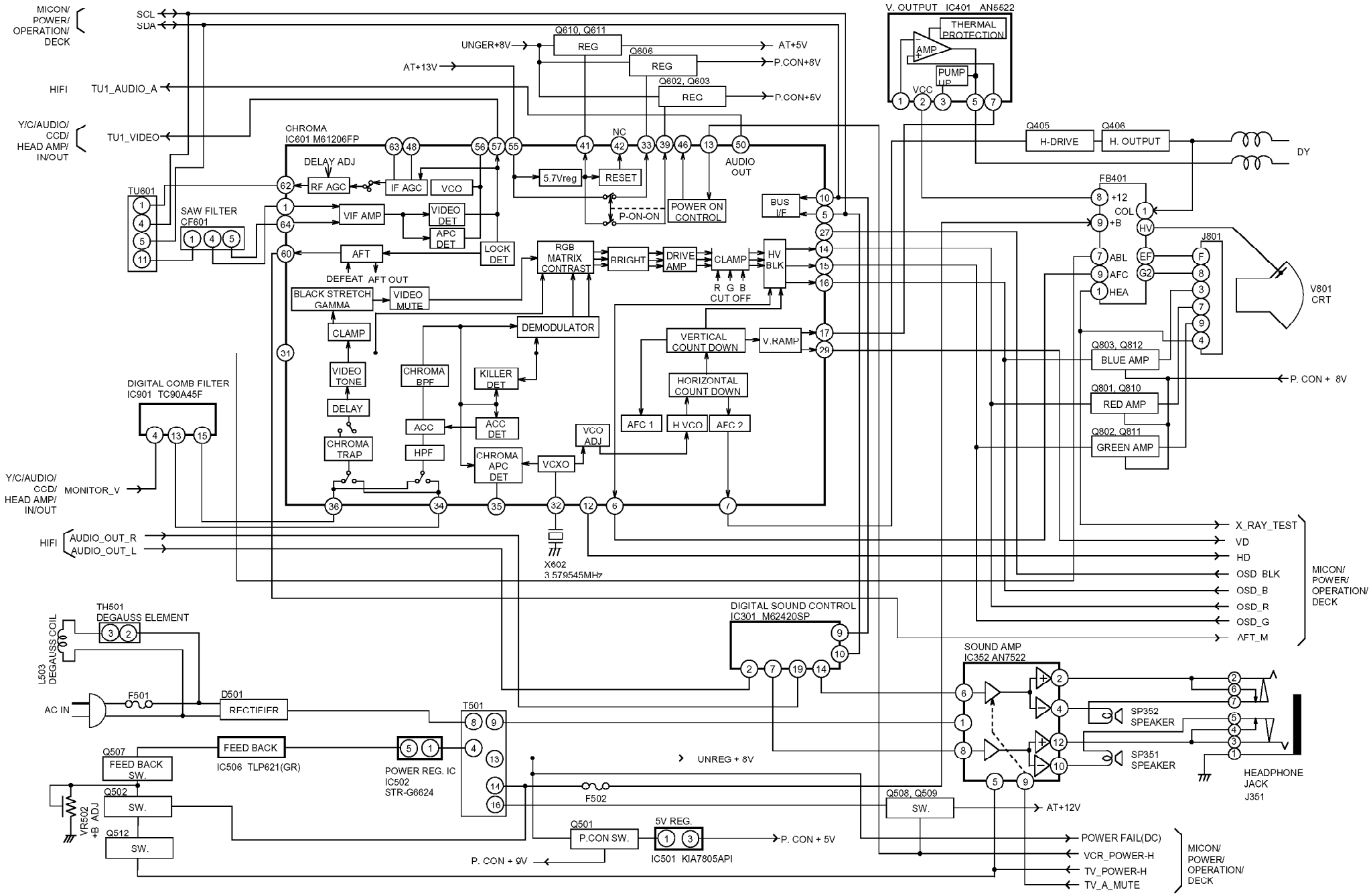
CAPACITORS

CC..... CERAMIC CAPACITOR
CE..... ALUMI ELECTROLYTIC CAPACITOR
CP..... POLYESTER CAPACITOR
CPP..... POLYPROPYLENE CAPACITOR
CPL..... PLASTIC CAPACITOR
CMP..... METAL POLYESTER CAPACITOR
CMPL..... METAL PLASTIC CAPACITOR
CMPP..... METAL POLYPROPYLENE CAPACITOR

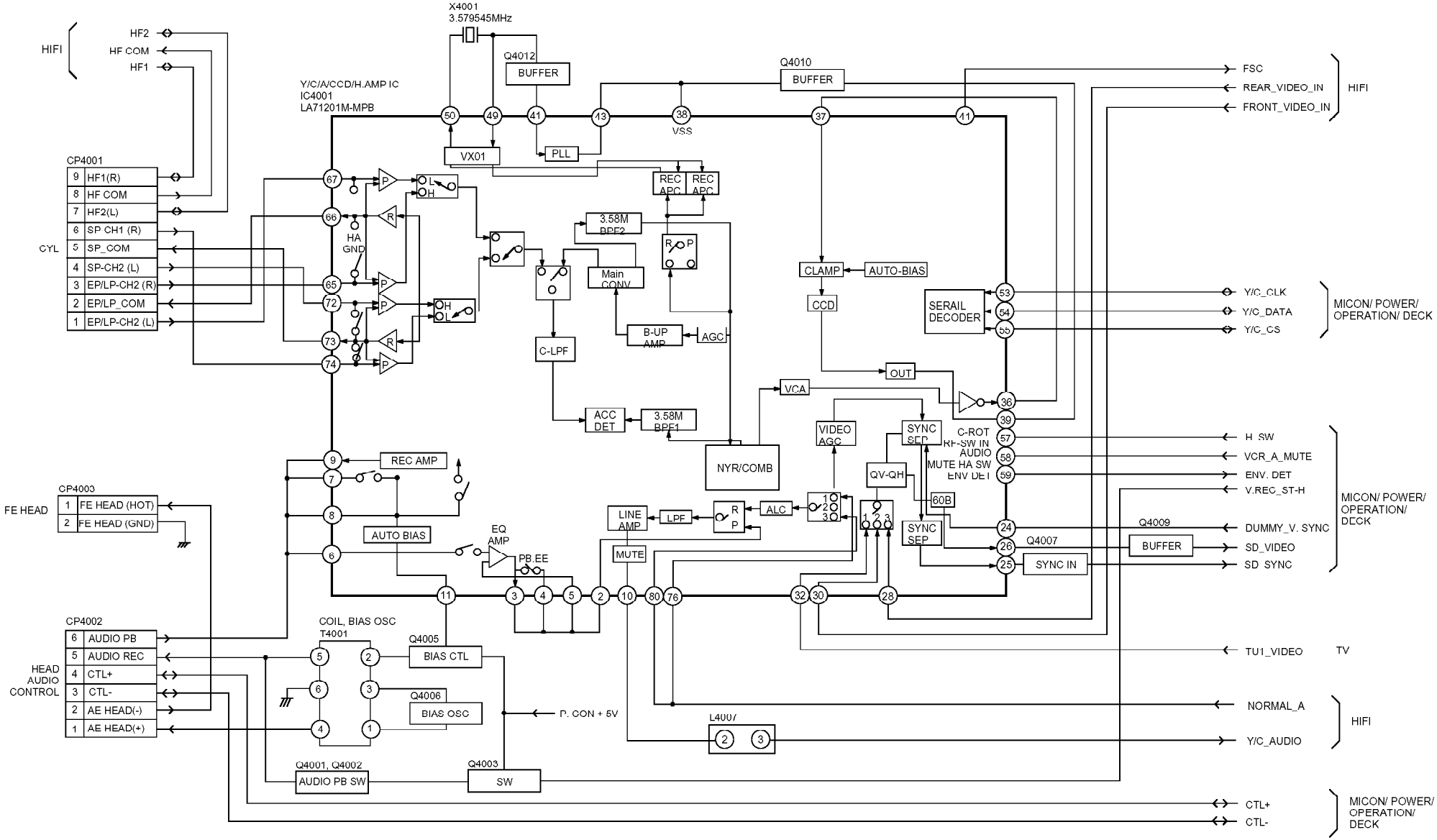
TOSHIBA VIDEO PRODUCTS PTE. LTD.

438B ALEXANDRA ROAD, BLOCK B #06-01 ALEXANDRA TECHNOPARK SINGAPORE 119968

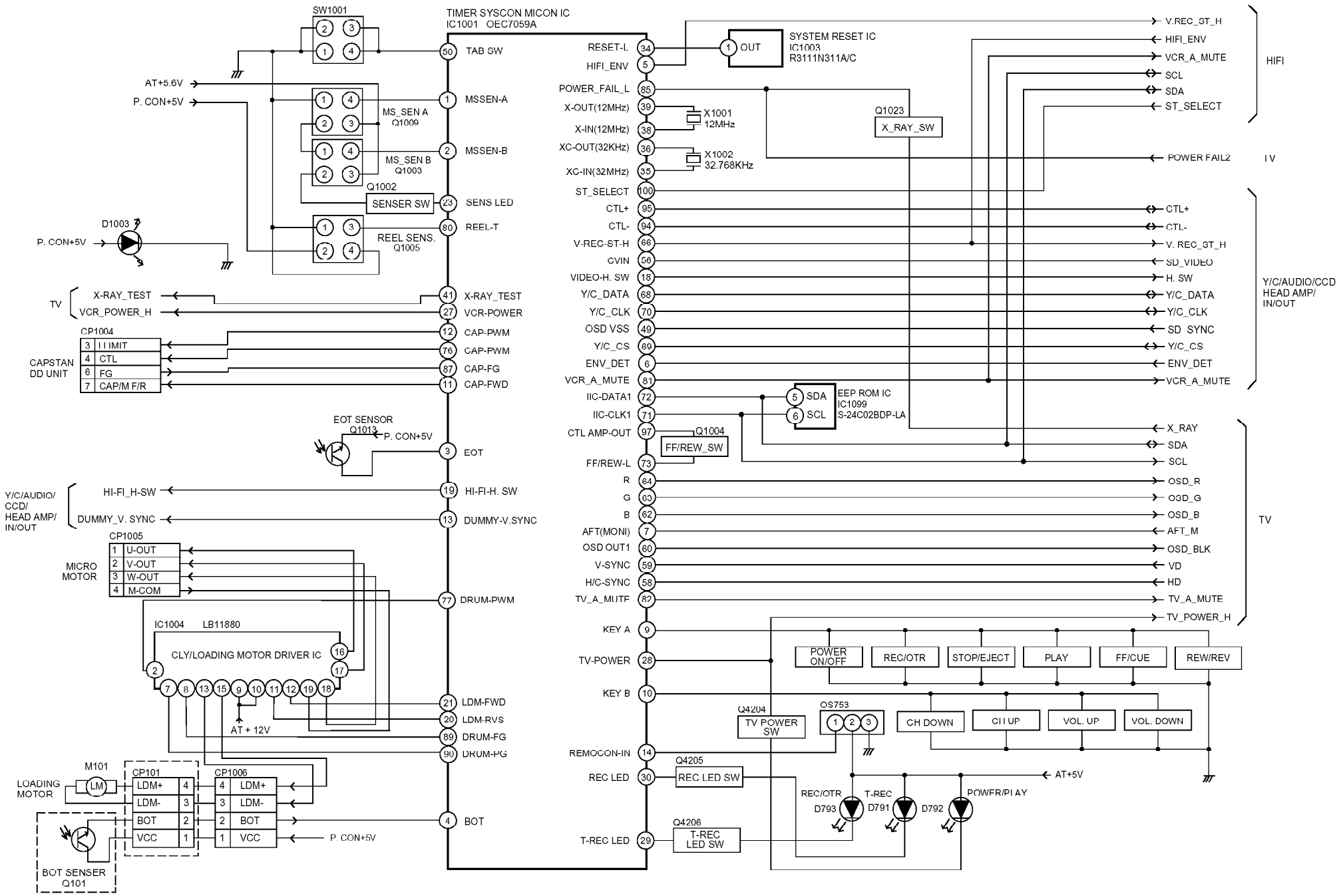
TV BLOCK DIAGRAM



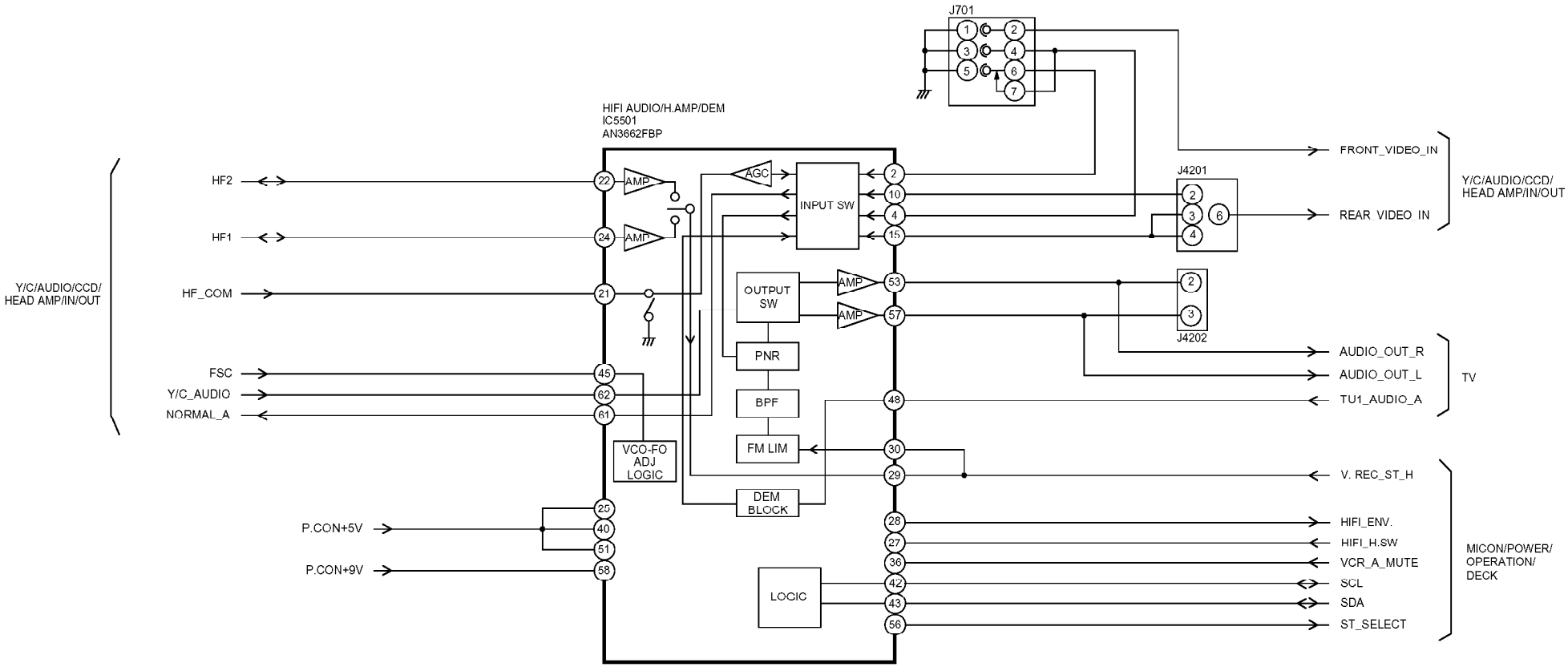
Y/C/AUDIO/CCD/HEAD AMP/IN/OUT BLOCK DIAGRAM



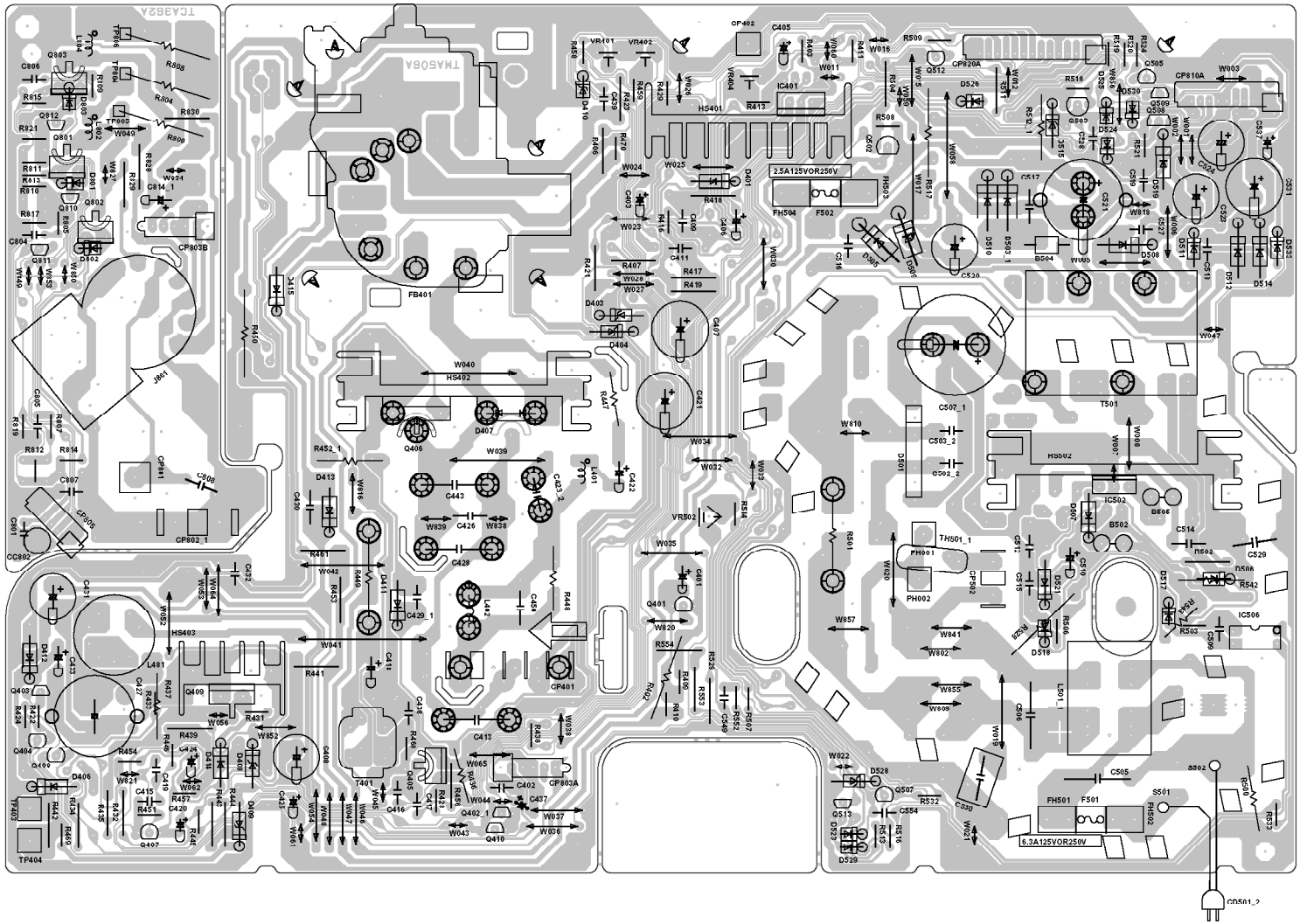
MICON/POWER/OPERATION/DECK BLOCK DIAGRAM



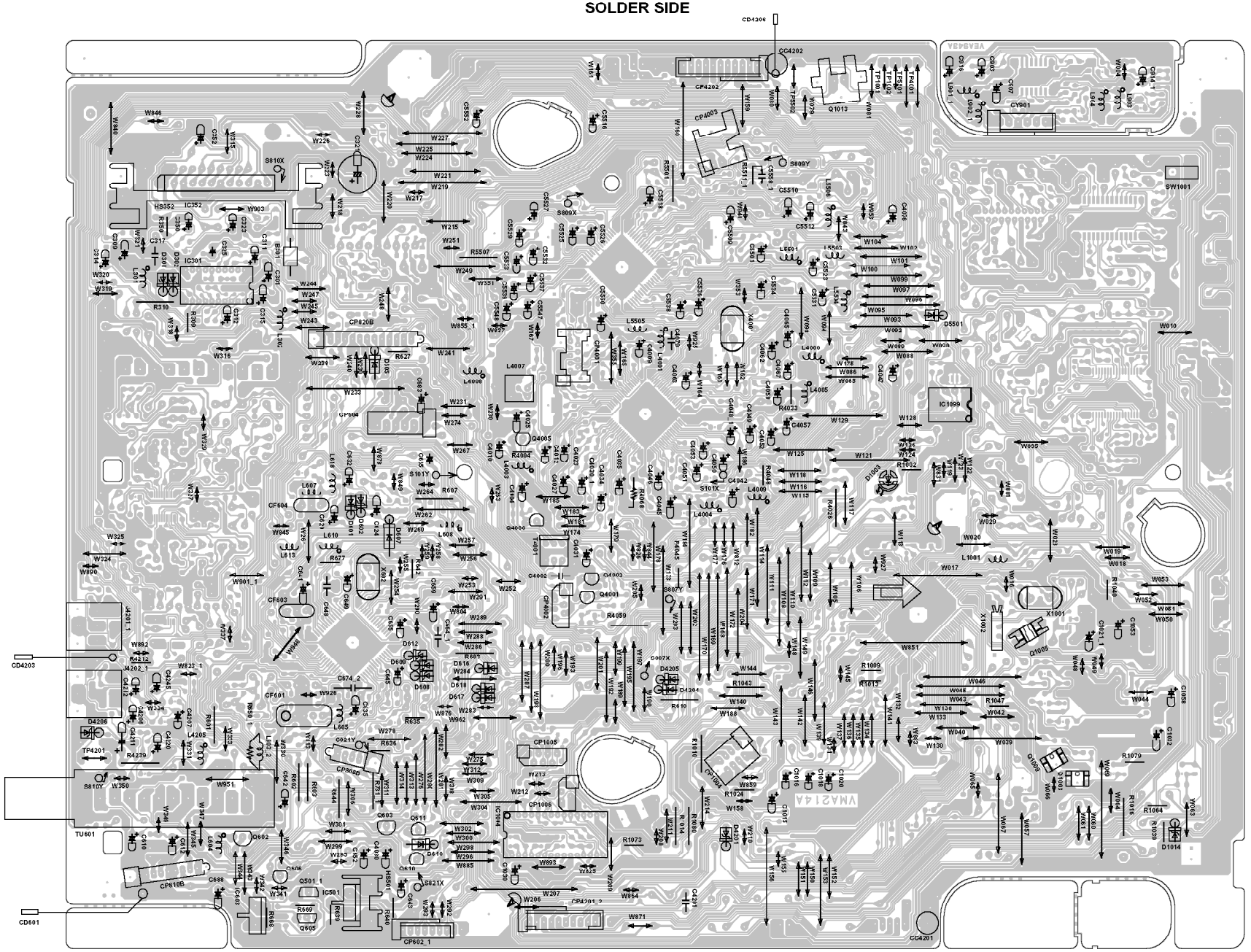
HIFI BLOCK DIAGRAM



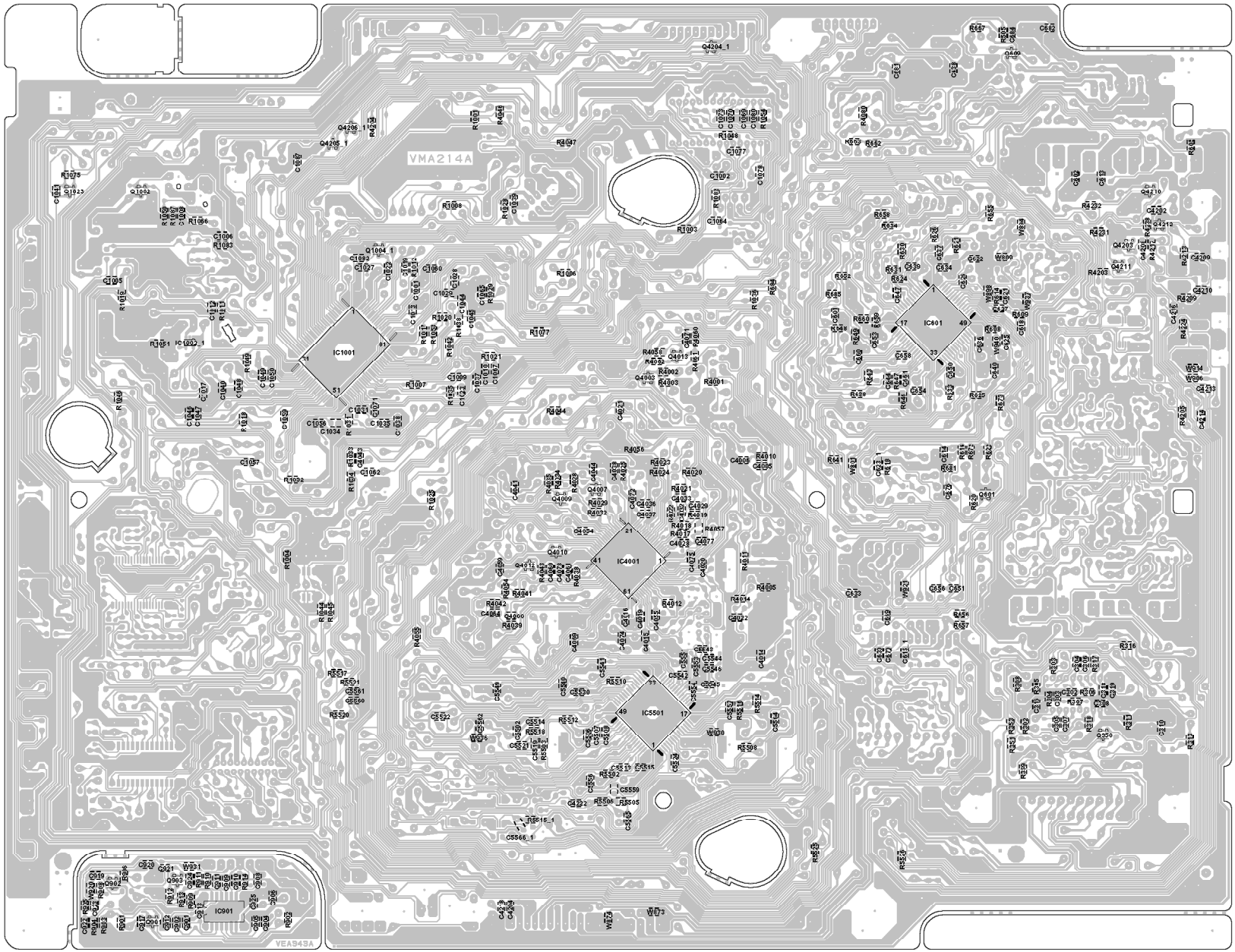
PRINTED CIRCUIT BOARDS
MAIN/CRT
SOLDER SIDE



PRINTED CIRCUIT BOARDS
SYSCON/COMB (INSERTED PARTS)
SOLDER SIDE

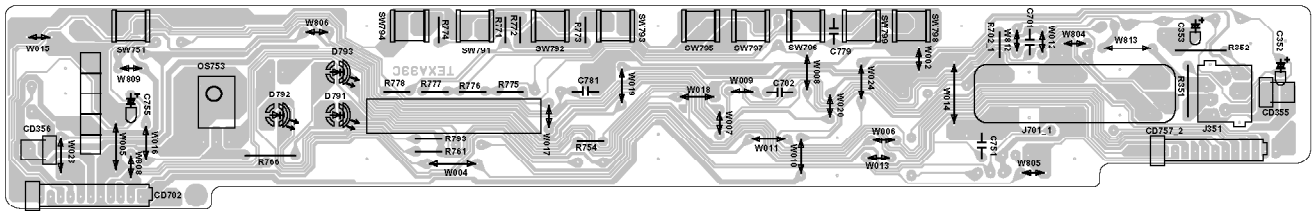


PRINTED CIRCUIT BOARDS
SYSCON/COMB (CHIP MOUNTED PARTS)
SOLDER SIDE

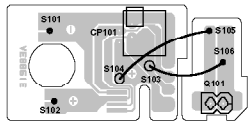


PRINTED CIRCUIT BOARDS

OPERATION
SOLDER SIDE

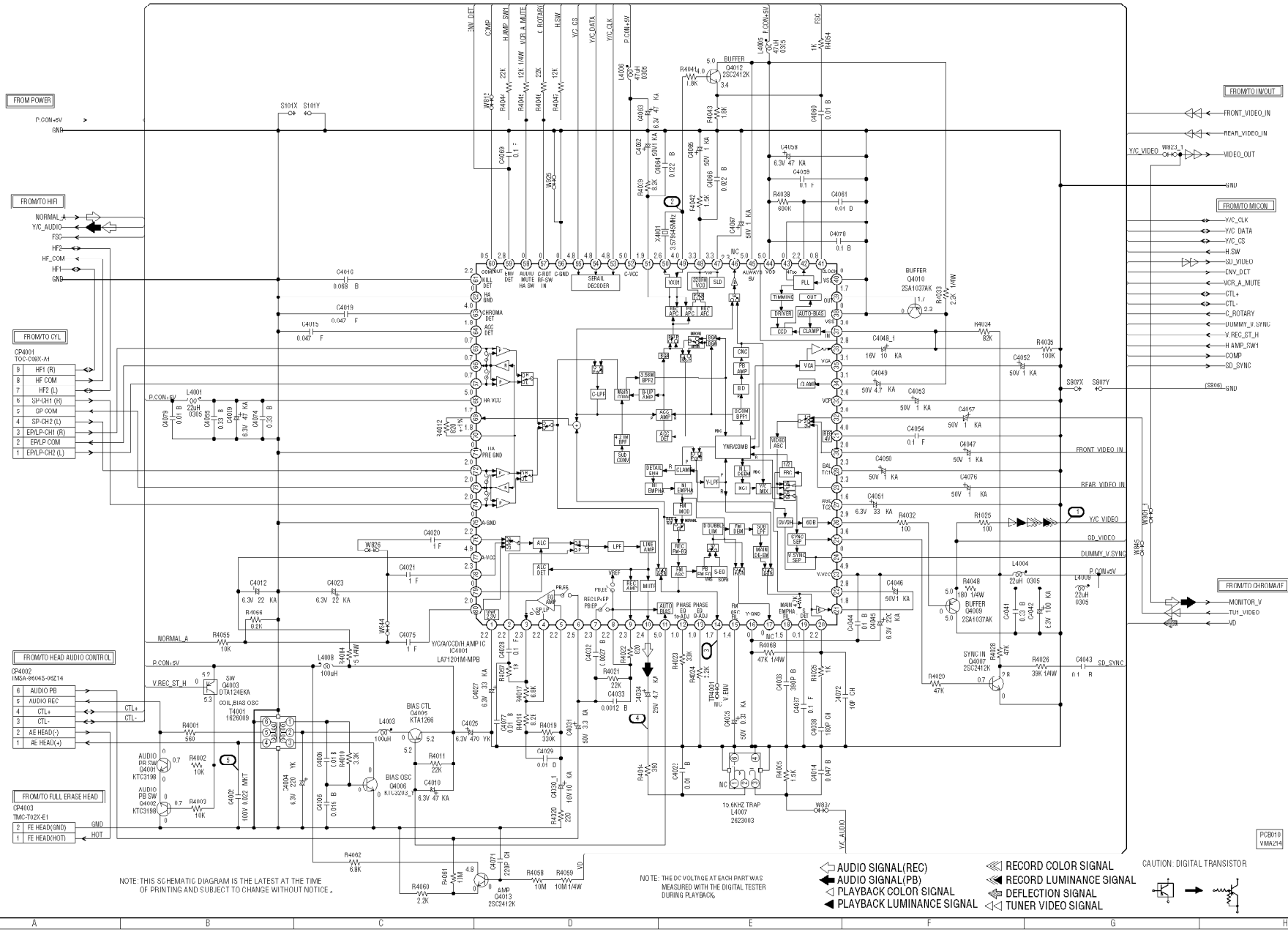


DECK
SOLDER SIDE

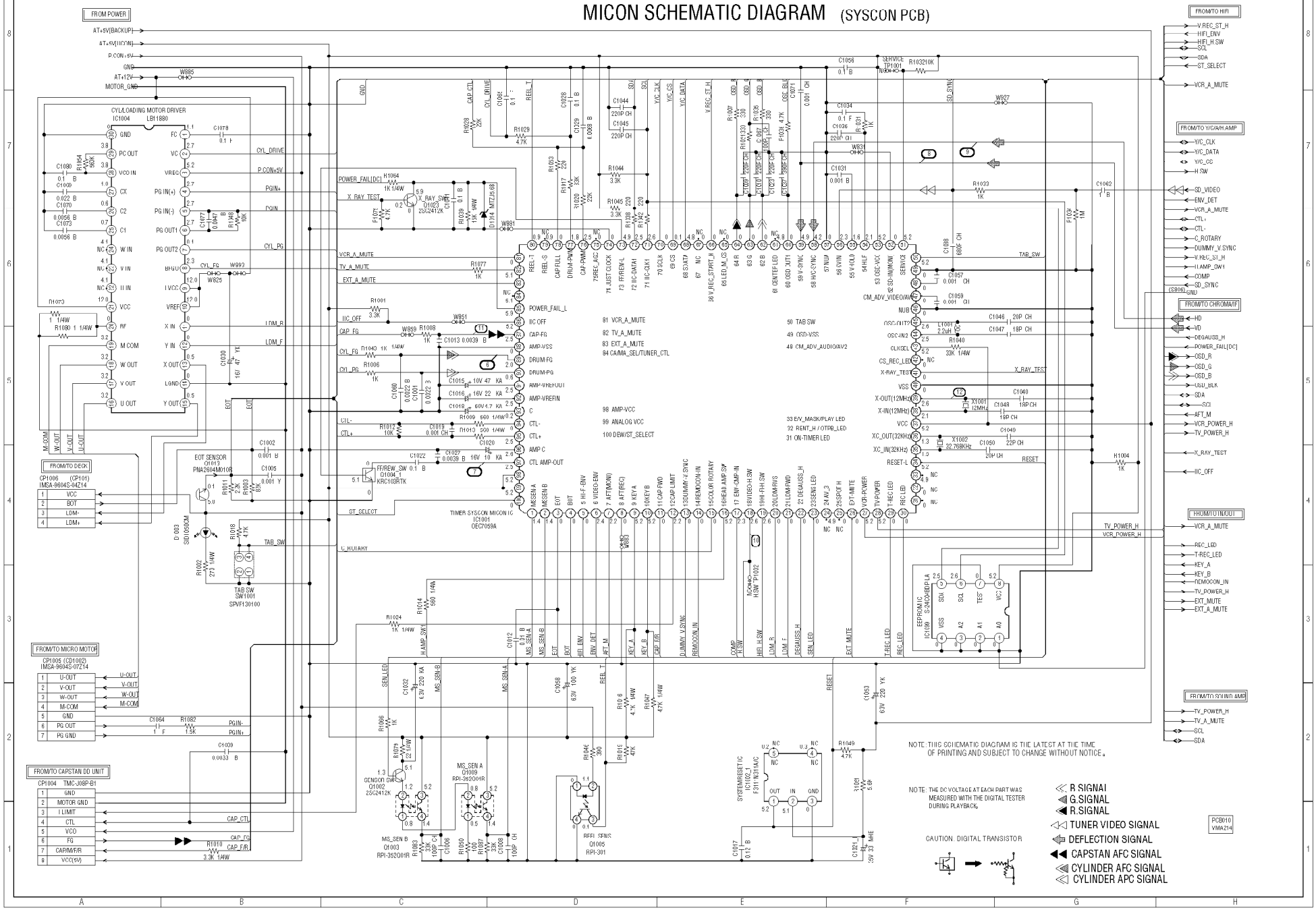


Y/C/AUDIO/CCD/HEAD AMP SCHEMATIC DIAGRAM

(SYSCON PCB)

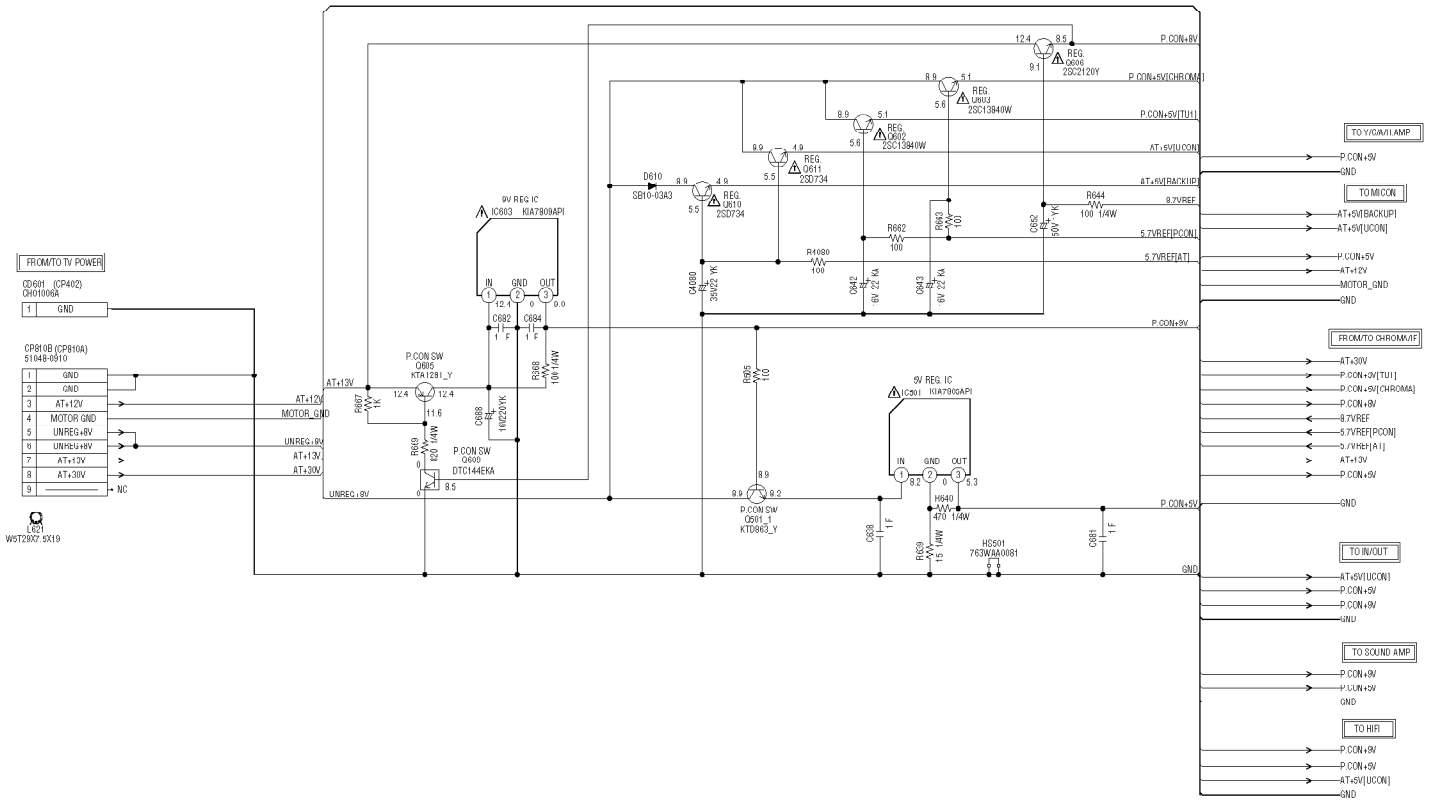


MICON SCHEMATIC DIAGRAM (SYSCON PCB)



POWER SCHEMATIC DIAGRAM

(SYSCON PCB)



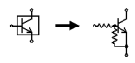
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED IN PARTS LIST ONLY 。

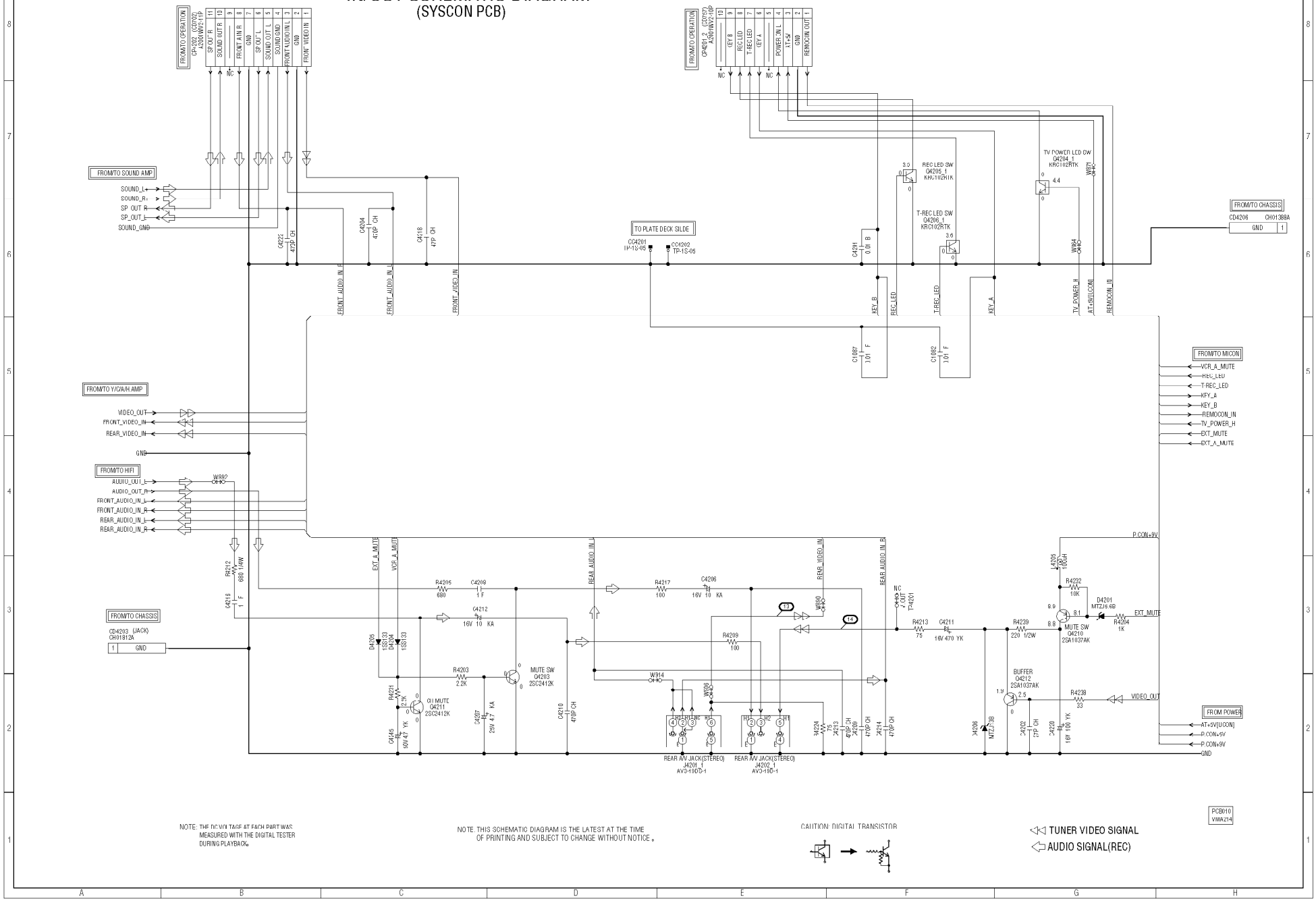
ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N-UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

CAUTION: DIGITAL TRANSISTOR



PCB010
VWA214

IN/OUT SCHEMATIC DIAGRAM
(SYSCON PCB)



NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER DURING PLAYBACK.

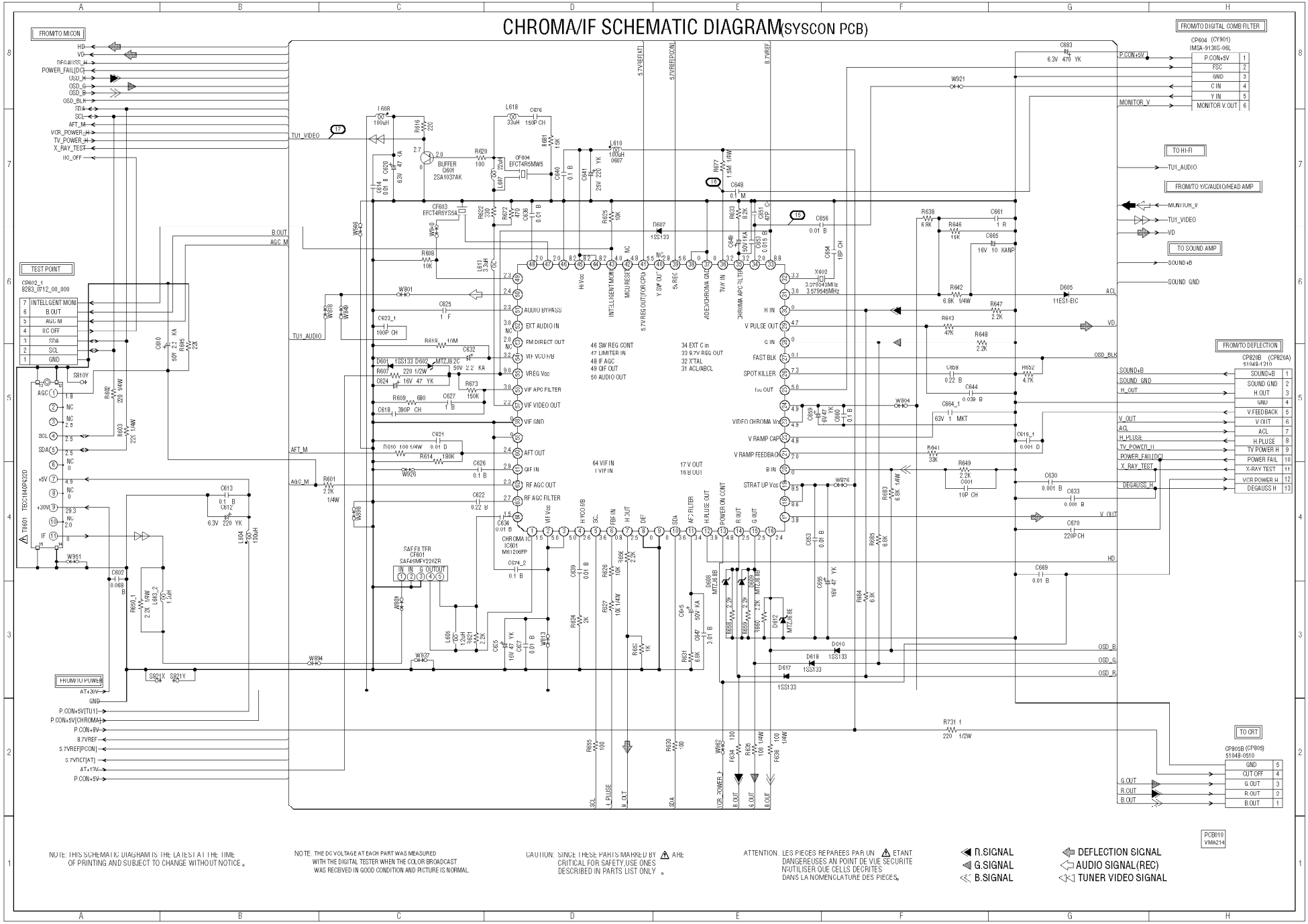
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

CAUTION: DIGITAL TRANSISTOR

TUNER VIDEO SIGNAL

AUDIO SIGNAL(REC)

CHROMA/IF SCHEMATIC DIAGRAM(SYSCON PCB)



NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

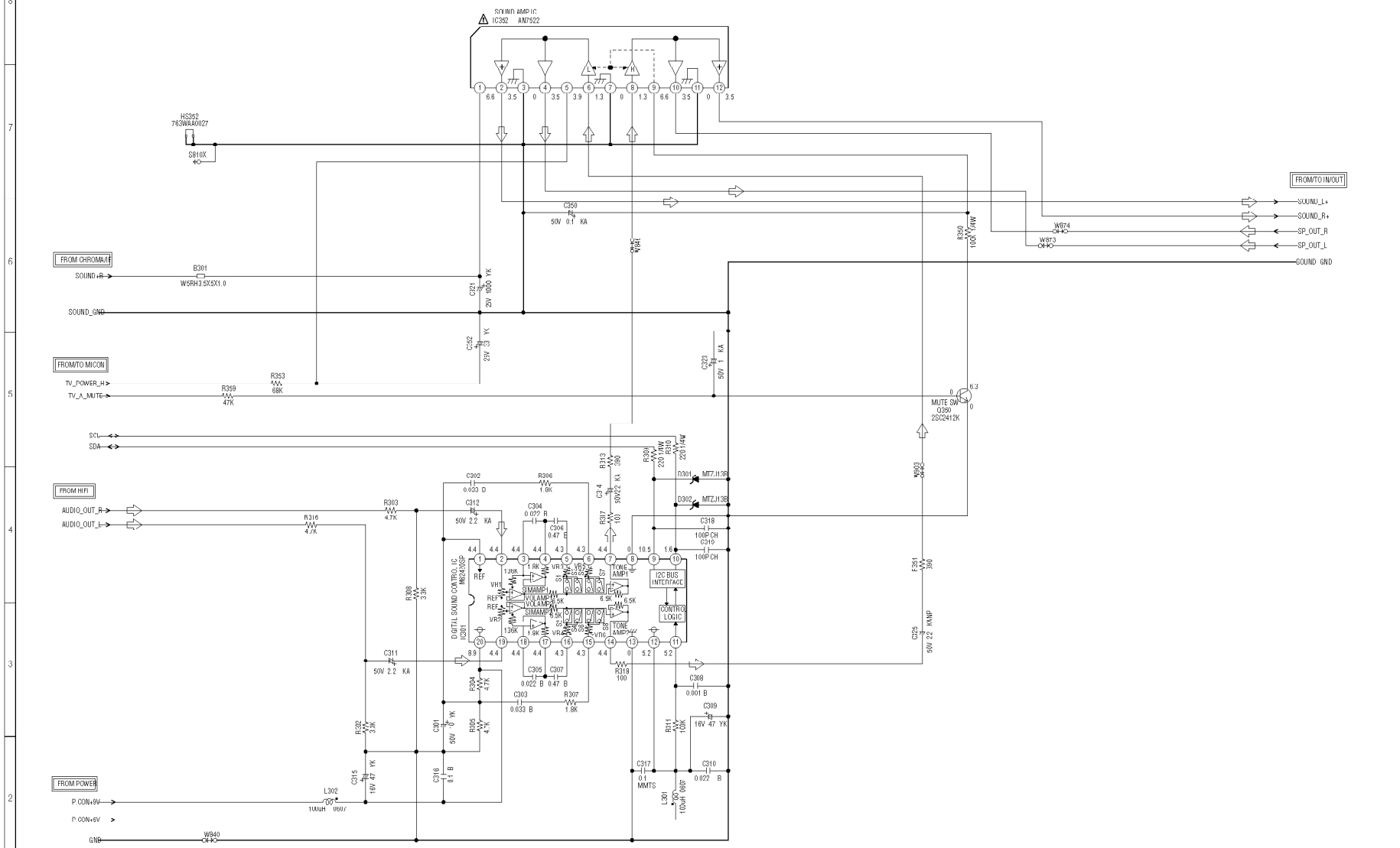
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY.USE ONES DESCRIBED IN PARTS LIST ONLY.

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES.

R.SIGNAL
G.SIGNAL
B.SIGNAL
DEFLECTION SIGNAL
AUDIO SIGNAL(REC)
TUNER VIDEO SIGNAL

SOUND AMP SCHEMATIC DIAGRAM
(SYSCON PCB)



NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED IN PARTS LIST ONLY 。

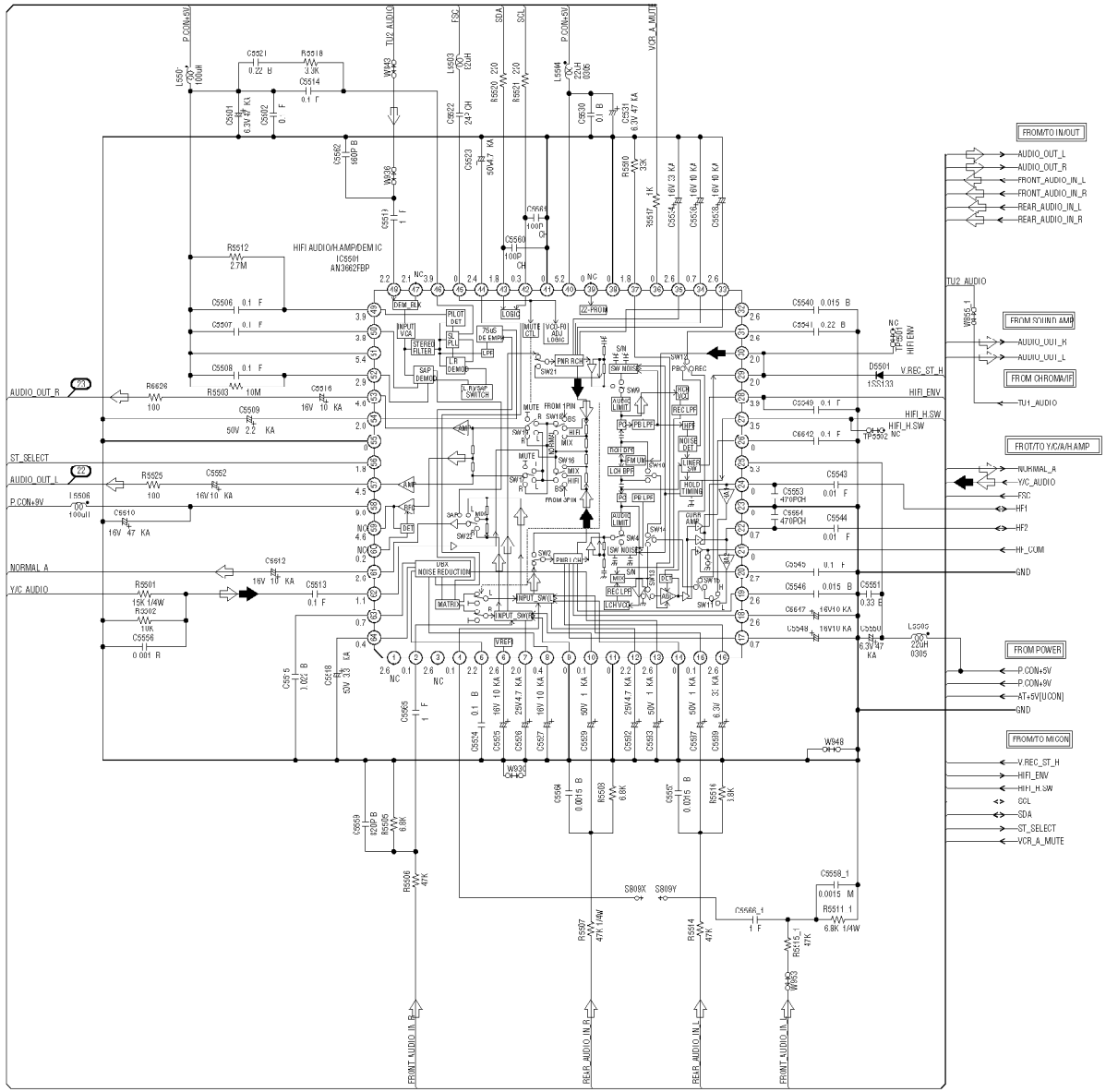
ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

⇦ AUDIO SIGNAL(REC)

PCB010
VMA214

HIFI SCHEMATIC DIAGRAM

(SYSCON PCB)



NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER DURING PLAYBACK.

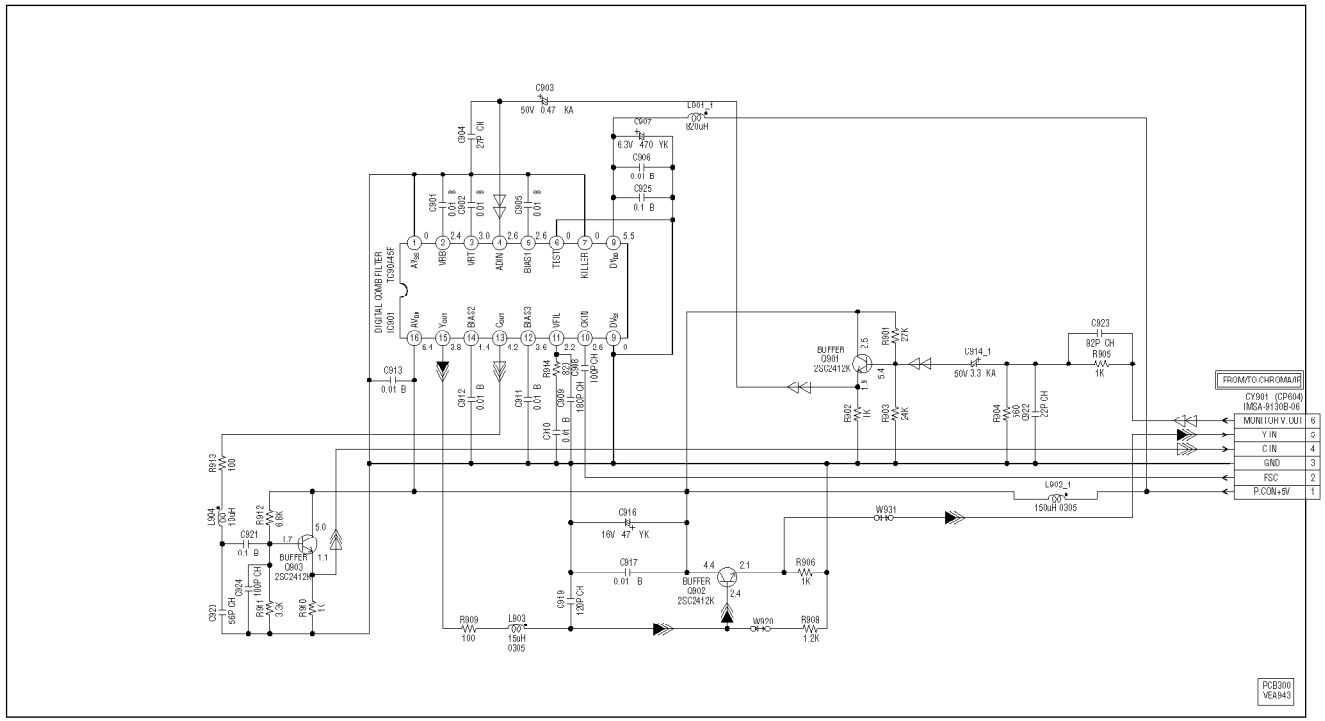
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

AUDIO SIGNAL(REC)

AUDIO SIGNAL(PB)

DIGITAL COMB FILTER SCHEMATIC DIAGRAM

(COMB PCB)

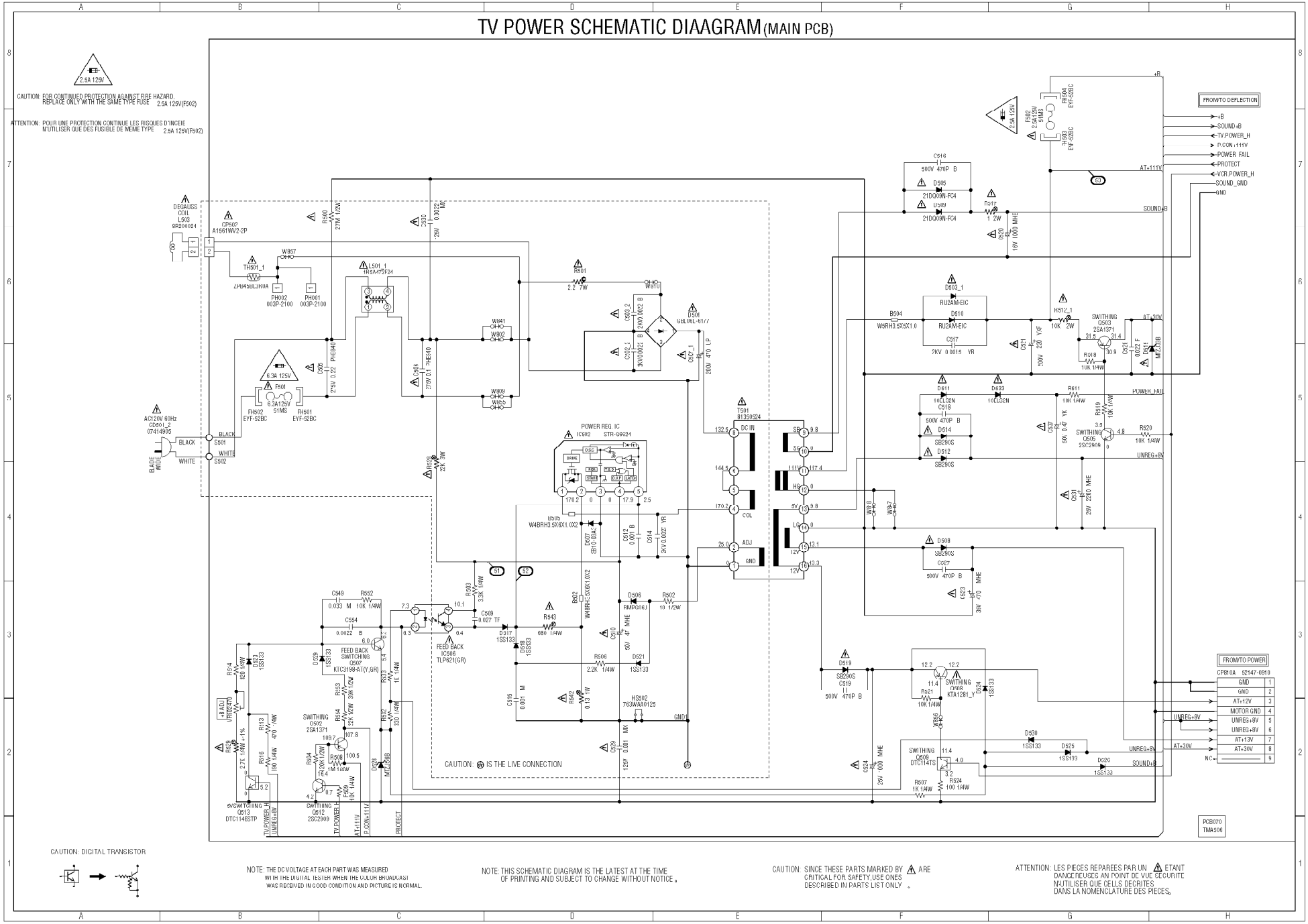


NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

TUNER VIDEO SIGNAL
LUMINANCE SIGNAL
COLOR SIGNAL

TV POWER SCHEMATIC DIAAGRAM (MAIN PCB)



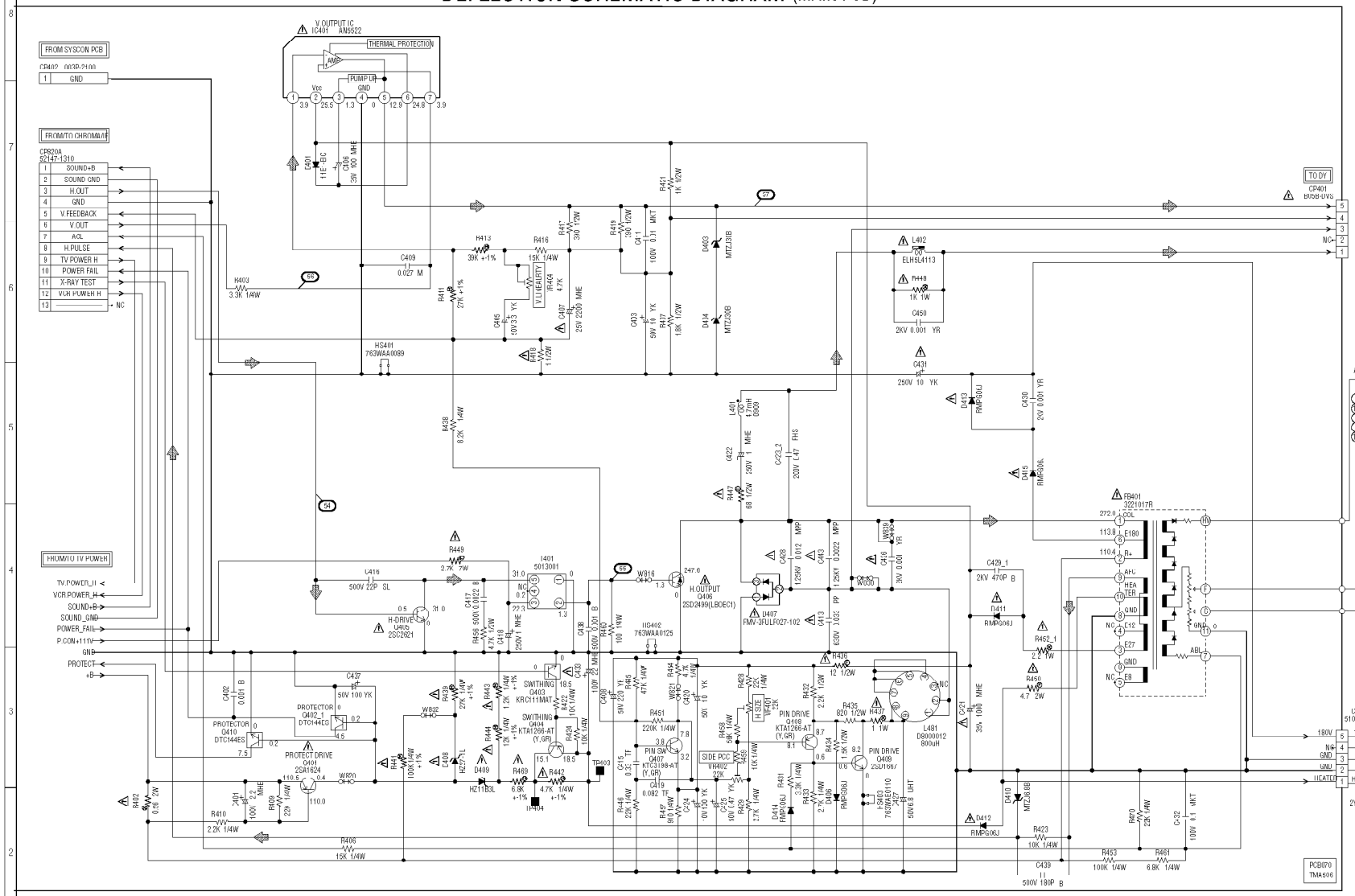
NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED IN PARTS LIST ONLY 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGCTICUSES AN POINT DC VUE SECURITE NUTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

DEFLECTION SCHEMATIC DIAGRAM (MAIN PCB)



NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

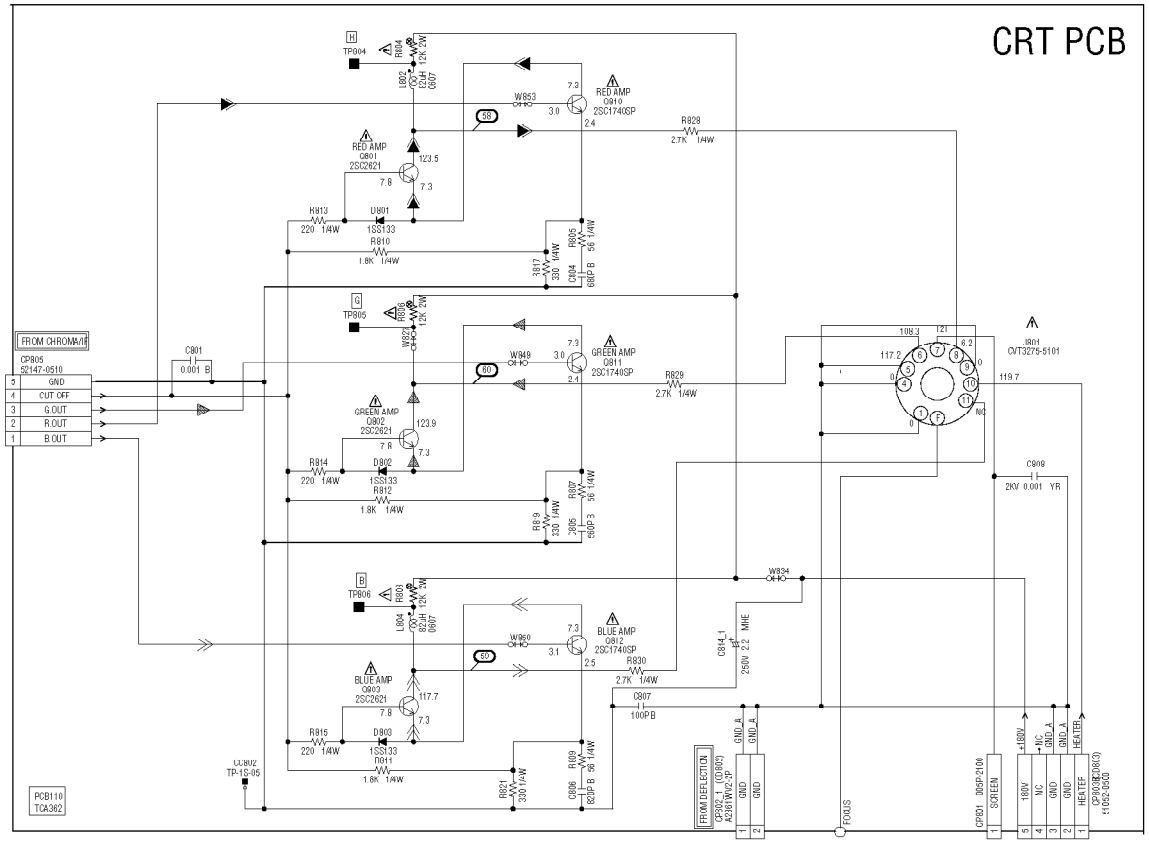
NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE NEUTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES.

CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED IN PARTS LIST ONLY 。

CAUTION: DIGITAL TRANSISTOR

CRT SCHEMATIC DIAGRAM
(CRT PCB)



NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BAR/DAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE.

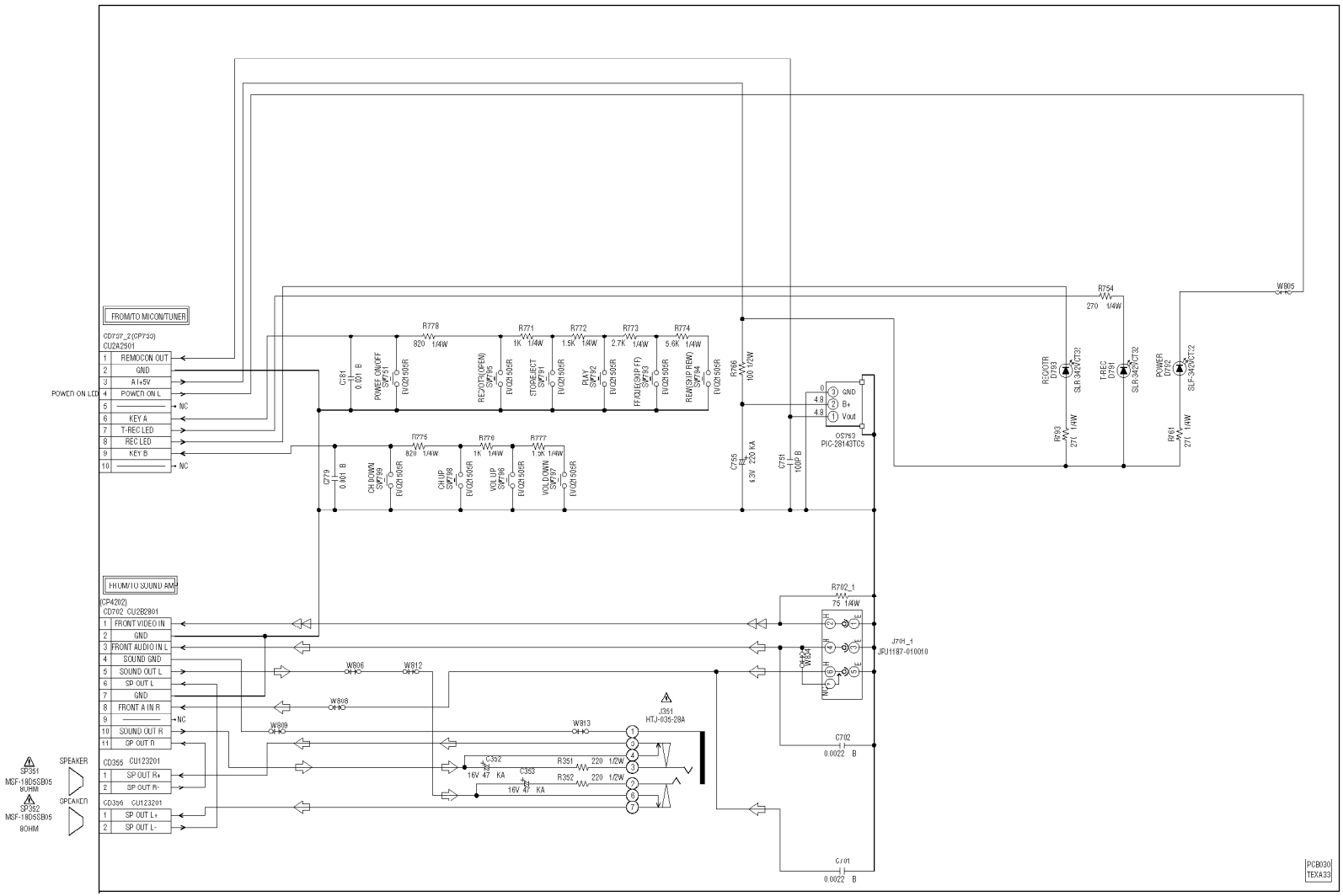
CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED IN PARTS LIST ONLY.

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES.

◀ R.SIGNAL
◀ G.SIGNAL
≪ B.SIGNAL

OPERATION SCHEMATIC DIAGRAM

(OPERATION PCB)



NOTE. THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER WHEN THE COLOR BROADCAST WAS RECEIVED IN GOOD CONDITION AND PICTURE IS NORMAL.

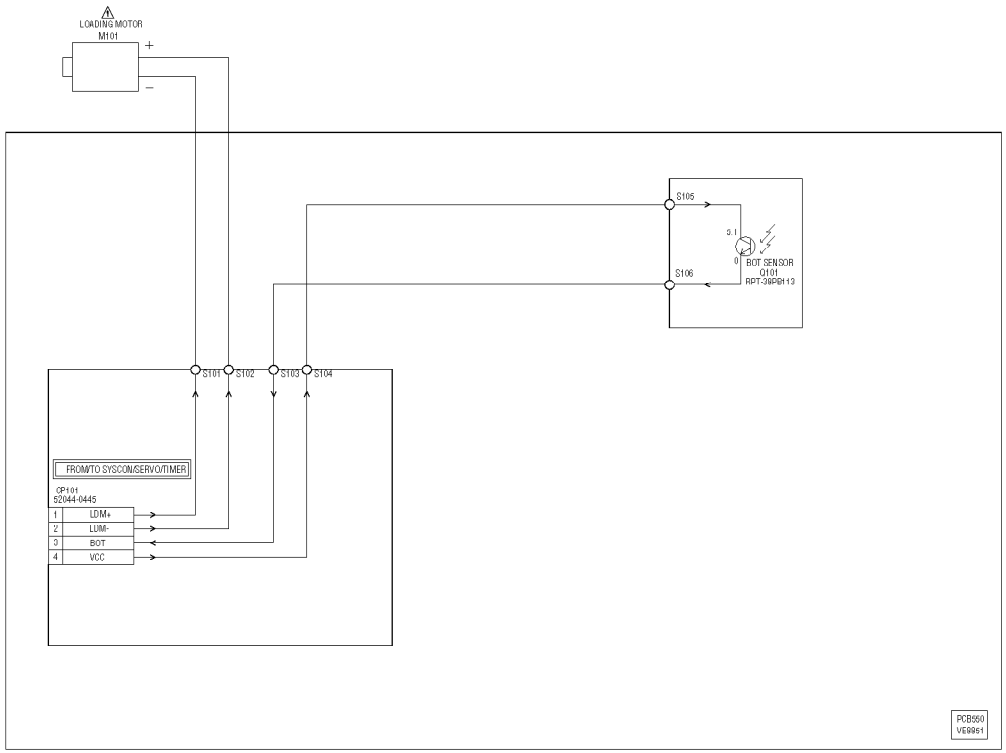
NOTE. THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

CAUTION. SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY. USE ONES DESCRIBED IN PARTS LIST ONLY 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

◁◁ TUNER VIDEO SIGNAL
◁ AUDIO SIGNAL

DECK SCHEMATIC DIAGRAM
(DECK PCB)



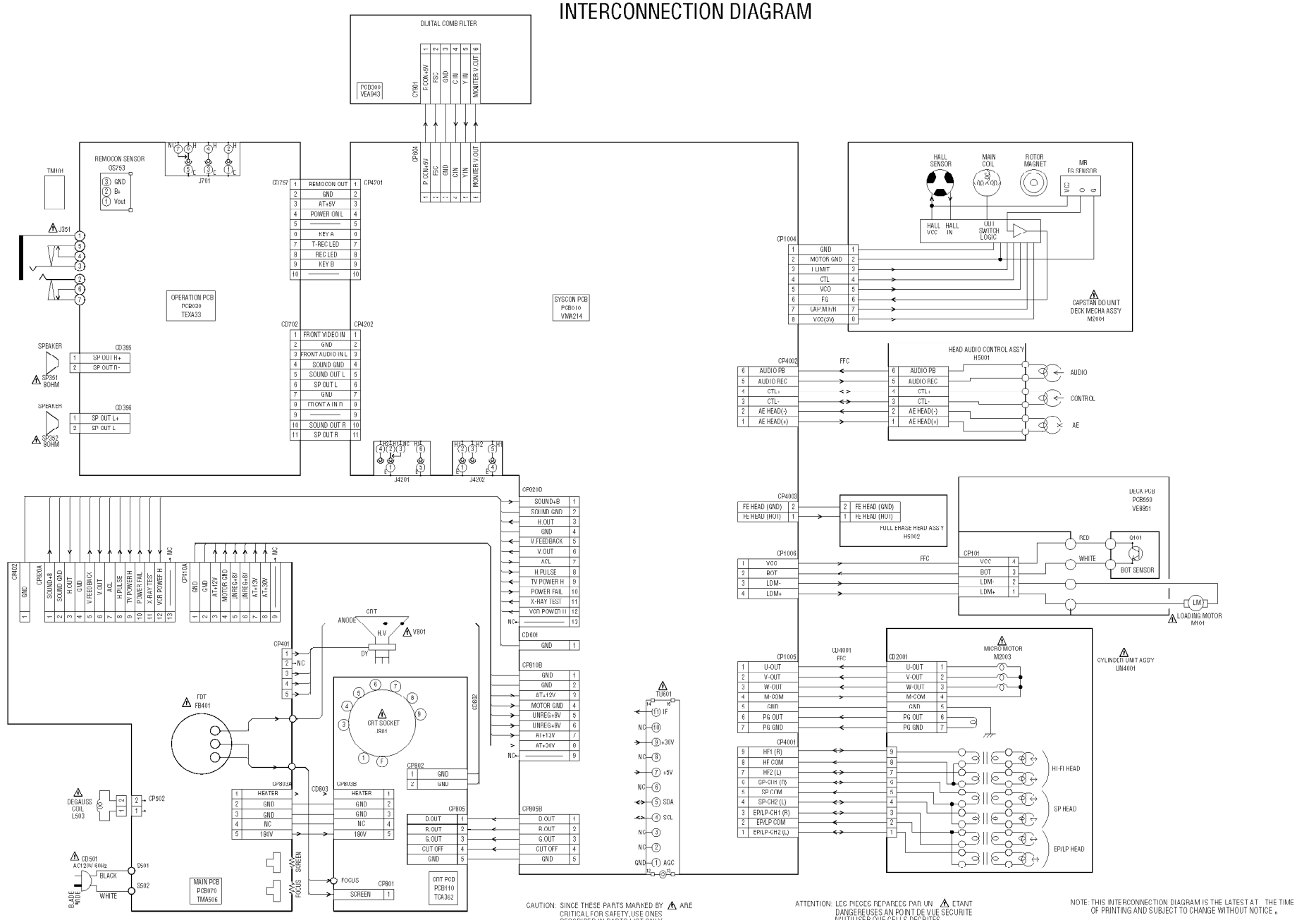
CAUTION: SINCE THOSE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY USE ONES DESCRIBED IN PARTS LIST ONLY 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AN POINT DE VUE SECURITE N-UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

NOTE: THE DC VOLTAGE AT EACH PART WAS MEASURED WITH THE DIGITAL TESTER DURING PLAYBACK。

NOTE: THIS SCHEMATIC DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

INTERCONNECTION DIAGRAM



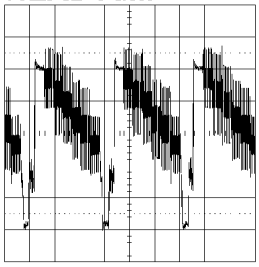
CAUTION: SINCE THESE PARTS MARKED BY ⚠ ARE CRITICAL FOR SAFETY, USE ONES DESCRIBED IN PARTS LIST ONLY 。

ATTENTION: LES PIECES REPAREES PAR UN ⚠ ETANT DANGEREUSES AU POINT DE VUE SECURITE N'UTILISER QUE CELLS DECRITES DANS LA NOMENCLATURE DES PIECES。

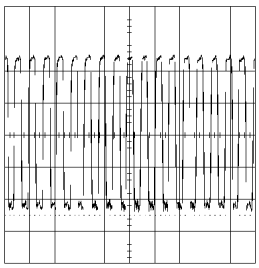
NOTE: THIS INTERCONNECTION DIAGRAM IS THE LATEST AT THE TIME OF PRINTING AND SUBJECT TO CHANGE WITHOUT NOTICE 。

WAVEFORMS

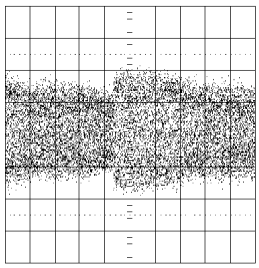
Y/C/AUDIO/CCD/ HEAD AMP



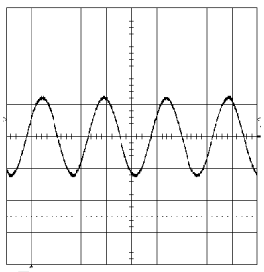
① REC/PB
0.5V 20µs/div



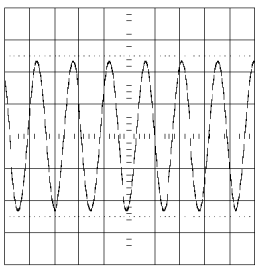
② REC/PB
100mV 0.5µs/div



③ PB
100mV 5ms/div

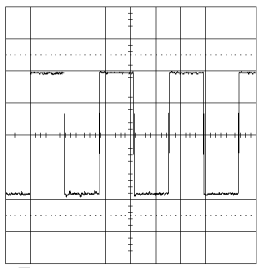


④ PB
0.5V 1ms/div

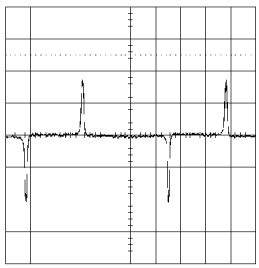


⑤ REC
20V 10µs/div

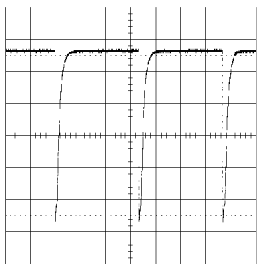
MICON



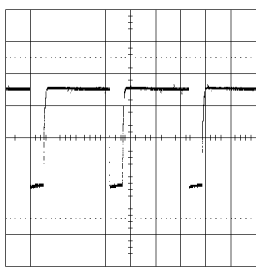
⑥ REC/PB
1V 0.5ms/div



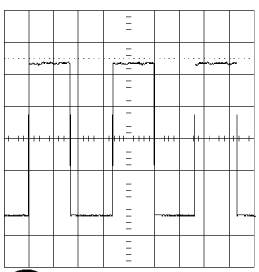
⑦ PB
1V 2ms/div



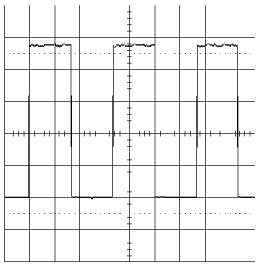
⑧ REC/PB
1V 5ms/div



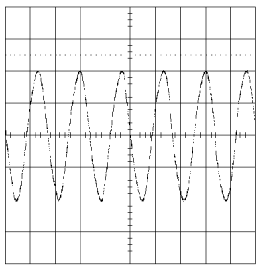
⑨ REC/PB
2V 20µs/div



⑩ REC/PB
1V 10ms/div

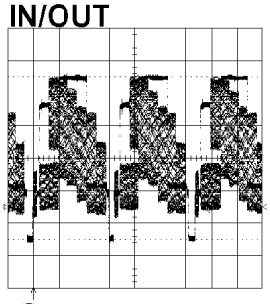


⑪ REC/PB
1V 10ms/div

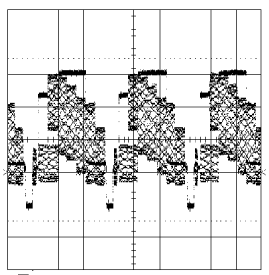


⑫ REC/PB
1V 50ns/div

IN/OUT

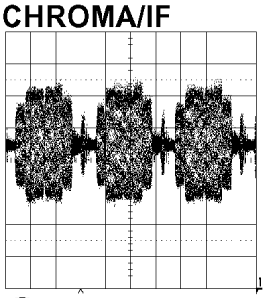


⑬ REC/PB
200mV 20ns/div



⑭ REC/PB
0.5V 20µs/div

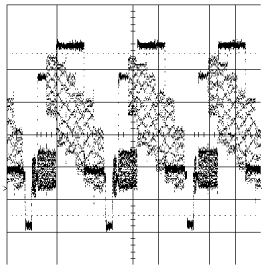
CHROMA/IF



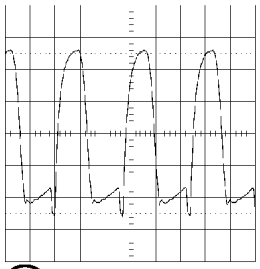
⑮ 200mV 20µs/div

NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.

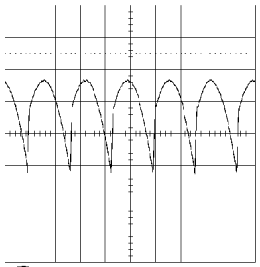
WAVEFORMS



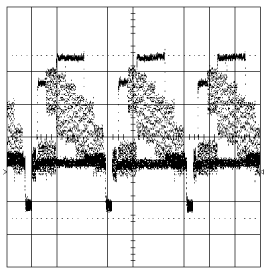
16 200mV 20µs/div



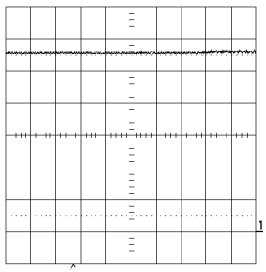
52 0.5V 5µs/div



57 1V 10ms/div

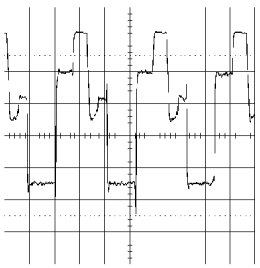


17 200mV 20µs/div



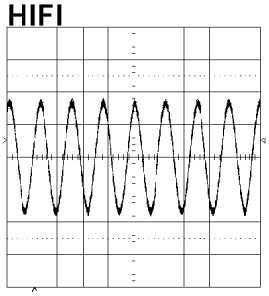
53 20V 1ms/div

CRT



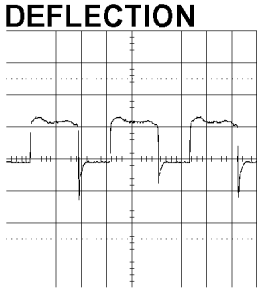
58 20.0V 20µs/div

HIFI

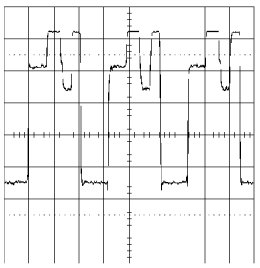


22 200mV 2ms/div

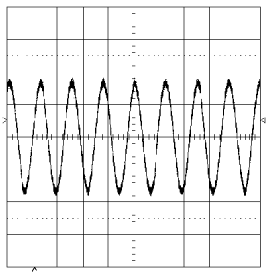
DEFLECTION



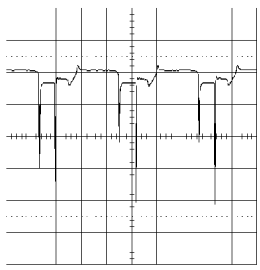
54 0.5V 20µs/div



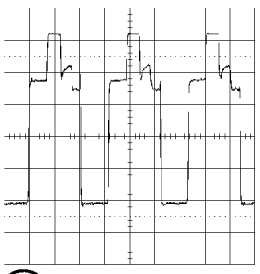
59 20.0V 20µs/div



23 200mV 2ms/div

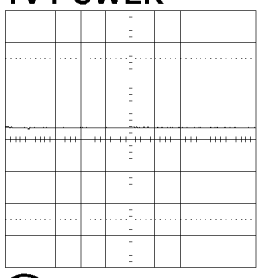


55 5V 20µs/div

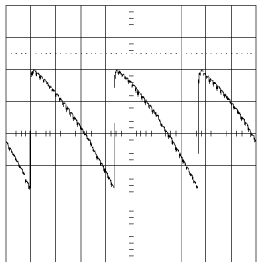


60 20.0V 20µs/div

TV POWER



51 5V 0.1ms/div



56 0.5V 5ms/div

NOTE: The following waveforms were measured at the point of the corresponding balloon number in the schematic diagram.